19" Auto scan Colour Monitor

Chassis :V50

Service
Service
Service

V50 109B5

109B50/109B55

Service Manual

Horizontal frequencies
30 - 97 kHz

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SAFETY NOTICE

ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING.

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

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IMPORTANT SAFETY NOTICE

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Proper service and repair is important to the safe, reliable operation of all PHILIPS Company** Equipment.
The service procedures recommended by PHILIPS and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully Read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper Service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. PHILIPS could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, PHILIPS has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by PHILIPS must first satisfy himself thoroughly that
neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

* * Hereafter throughout this manual, PHILIPS Company Will be referred to as PHILIPS.

FOR PRODUCTS CONTAINING LASER :

DANGER- Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION- The use of optical instruments with this product will increase eye hazard.

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE MANUAL.

WARNING

Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from PHILIPS. PHILIPS assumes no liability, express or implied, arising out of any unauthorized modification Of design.
Servicer assumes all liability.

*** Broken Line**

Technical Data

Technical Specification*

CRT

Size and deflection	:19 inch/46cm, 90° deflection angle
Dot pitch	: 0.25 mm with black matrix
Horizontal pitch	: 0.21 mm
Tube type	: Shadow mask, real flat, high contrast, anti-glare, anti-static,anti reflection, light transmission 45%
Phosphor	: P22
Recommended display area	: 14.0" x 10.4"/355 x 265 mm
Maximum display area	: 14.4" x 10.8"/365 x 270 mm

Scanning

Horizontal scanning	: 30 - 97 KHz
Vertical scanning	: 50 - 160 Hz

Video

Video dot rate	: 203 Mhz

Input impedance

-Video	: 75 Ohms
- Sync	: 2.2K Ohms
Signal input level	: 0.7Vpp Separate sync
Sync input signal	: Composite sync.
Sync polarities	: Positive or negative

White Color Temperature
Chromaticity CIE coordinates:

at 9300 °k	x = 0.283 +/- 0.015	y = 0.297 +/- 0.015
at 6500 °k	x = 0.313 +/- 0.015	y = 0.329 +/- 0.015
at 5500 °k	x = 0.332 +/- 0.015	y = 0.347 +/- 0.015
at sRGB	x = 0.313 +/- 0.015	y = 0.329 +/- 0.015

Carton box

Size (with pedestal)	: 440(W)x433(H)x449(D)
Net weight	: 20 Kg
Power supply	: 90 - 264 VAC, 50/60 Hz

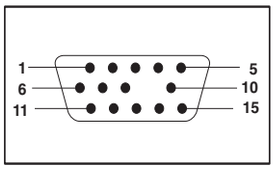
Operating condition

Temperature	: 0 °C to 40 °C
Relative Humidety	: 10 % - 90 % (W/O condensation)

Storage condition

Temperature	: - 25 °C to 65 °C
Relative Humidity	: 5 % to 95 % (W/O condensation)

Pin assignment :



The 15-pin D-sub connector(male) of the signal cable :

Pin No.	Assignment	Pin No.	Assignment
1	Red video input	9	No pin
2	Green video input	10	Logic. Ground
3	Blue video input	11	Identical output-connected to pin 10
4	Identical output-connected to pin 10	12	Serial data line(SDA)
5	fground	13	H.Sync /H + V
6	Red video ground	14	V.Sync(VCLK for DDC)
7	Green video ground	15	Data clock line(SCL)
8	Blue video ground		

Data Storage

Factory preset modes:

This monitor has 8 factory-preset modes as indicated in the following table :

	Mode	Resolution	Frequen		Sync polarity	
			H(KHz)	V(Hz)	H	V
M01	VGA	720 x 400	31.5	70	-	+
M02	VGA	640 x 480	31.47	60	-	-
M03	VGA	640 x 480	43.3	85	-	-
M04	SVGA	800 x 600	46.9	75	+	+
M05	SVGA	800 x 600	53.674	85	+	+
M06	EVGA	1080 x 960	60.0	60	+	+
M07	EVGA	1024 x 768	68.7	85	+	+
M08		1280 x 1024	64.0	60	+	+

Automatic Power Saving

If you have VESA's DPMS compliance display card or software installed in your PC, the monitor can automatically reduce power consumption when power saving function active. And if an input from keyboard, mouse or other input devices is detected, the monitor will automatically "wake up". The following table shows the power consumption and signaling of this automatic power saving feature :

Power Management Definition						
VESA's mode	VIDEO	H-SYNC	V-SYNC	POWER USED	POWER SAVING(%)	LED COLOR
ON	Active	Yes	Yes	Tyical 75 w	0 %	Green
OFF	Blanked	No	No	<2 w	97 %	Flashing Green

This monitor is ENERGY STAR compliant.

As an ENERGY STAR Partner, PHILIPS has determined that this product meets the ENERGY STAR guidelines for energy efficiency

ENERGY STAR® is a U.S. registered mark. AS AN ENERGY STAR PARTNER, DELL Computer Corporation HAS DETERMINED THAT THIS PRODUCT MEETS THE ENERGY STAR GUIDELINES FOR ENERGY EFFICIENCY.

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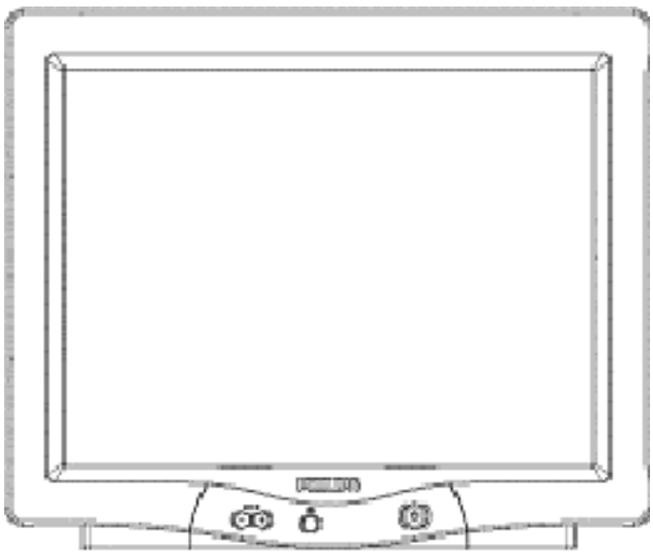
Front control & OSD

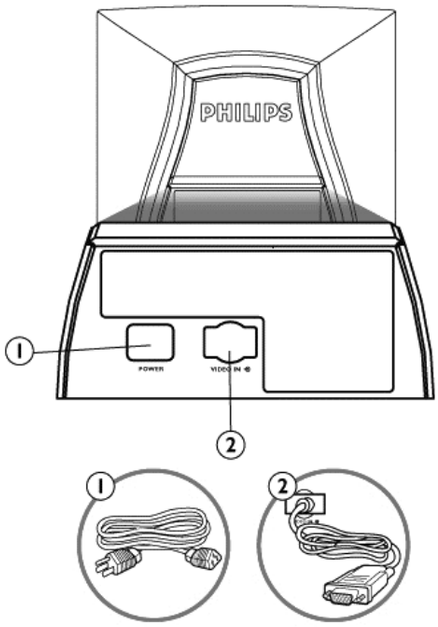
Front View



109B5/109E5/109F5

Power button switches your monitor on.
OK button which when pressed will take you to the OSD controls
Contrast hotkey. When the "-" button is pressed, the adjustment controls for the CONTRAST will show up.
Brightness hotkey. When the "+" button is pressed, the adjustment controls for BRIGHTNESS will show up.
"-" and "+" buttons, are used for adjusting the OSD of your monitor.

Rear view



1. Power in - attach power cable here.
2. Video In - this is a cable which is already attached to your monitor. Connect the other end of the cable to your PC.

Description of the On Screen Display

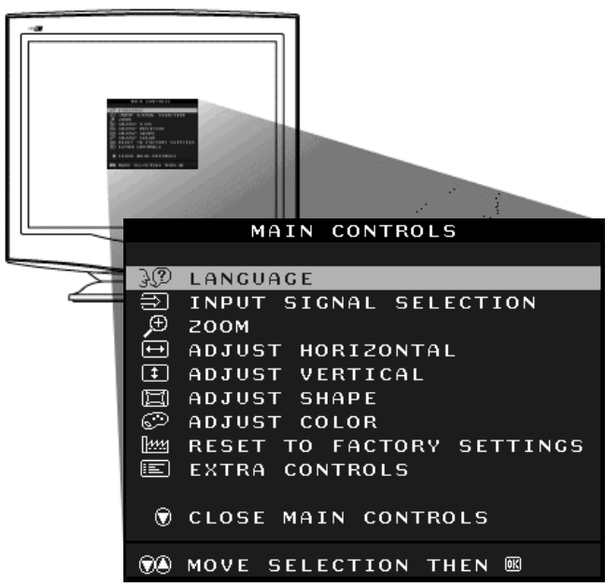
What is the On-Screen Display?

This is a feature in all Philips monitors which allows an end-user to adjust screen performance of monitors directly though an on-screen instruction window. The user interface provides user-friendliness and ease-of-use when operating the monitor.

Basic and simple instruction on the control keys.

On the front controls of your monitor, once you press the OK button, the On Screen Display (OSD) Main Controls window will pop up and you can now start making adjustments to your monitor's various features.

Use the − + the keys to make your adjustments within.

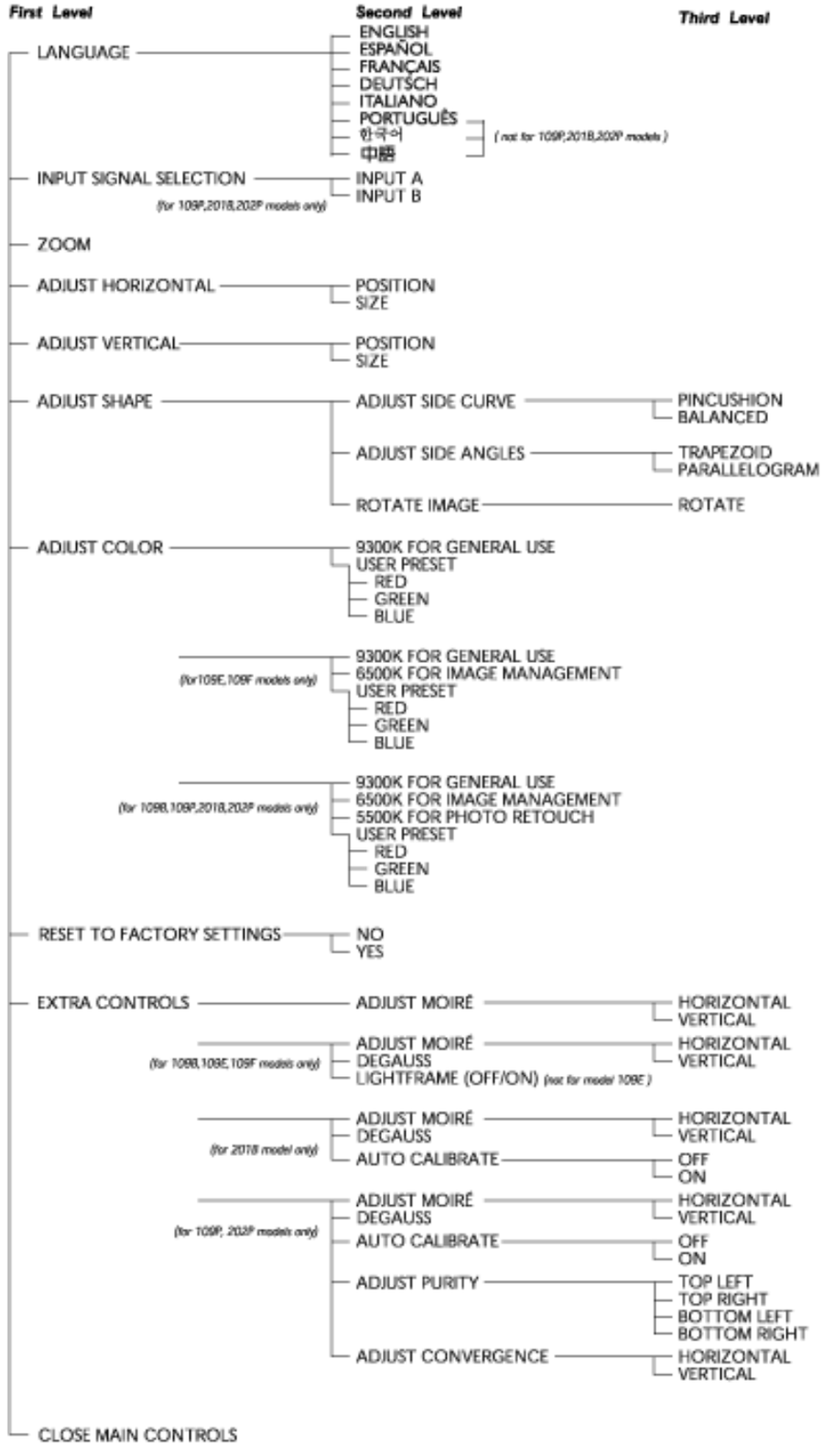


OSD menu tree

The OSD Tree

Below is an overall view of the structure of the On-Screen Display. You can use this as reference when you want to later on work your way around the different adjustments.

CRT OSD tree / English



Lock/Unlock, Factory Mode, Burn In, Service Mode

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OSD Lock

OSD lock is a feature which disables the OSD controls. It can be used when the monitor is set up for demonstration purposes or when adjustment of the OSD is not desirable.

Switch on OSD lock feature:

Press and hold the button continuously for 15 seconds.

Release the button when the message

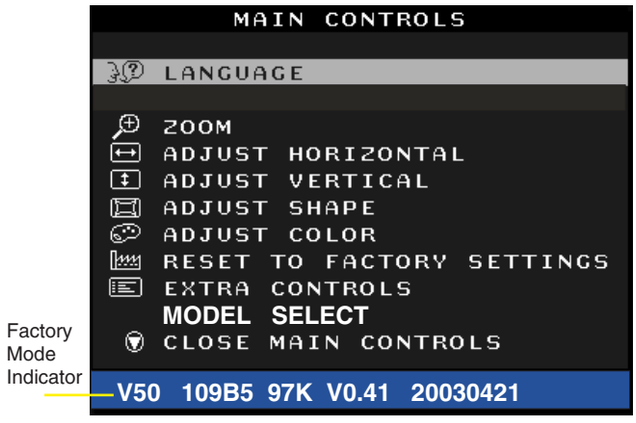
"CONTROL MENU IS LOCKED" appears.

Switch off OSD lock feature:

Press and hold the button continuously for 15 seconds or until the message window "CONTROL MENU IS LOCKED" disappears, and "MAIN CONTROLS" appears.

To access factory mode

1. Turn off monitor (don't turn off PC)
2. Press '" ⊖ ⊕ " and " ⏻ " simultaneously on the front control panel,then press " OSD ",wait till the OSD menu with characters V50 109B5 97K V0.41 20030421 (below OSD menu)" come on the screen of monitor.



3. If OSD menu disappears on the screen of monitor, press " OSD " again (anytime), then the OSD menu comes on the screen again.
4. Using " ⊖ ⊕ " : to select OSD menu.
5. Using " ⊖ ⊕ " : to increase or decrease the setting.
6. Using " OSD " to access/confirm the selection.

To leave factory mode

7. After alignment of factory mode, turn off monitor (if you do not turn off monitor, the OSD menu is always at the factory mode), then turn on monitor again (at this moment, the OSD menu goes back to user mode).

To access BURN IN mode

First of all, monitor displays an image.

1. Disconnect the video cable (interface cable).
2. Turn off monitor
3. Press '" ⊖ ⊕ " and " ⏻ " simultaneously on the front control panel,then the BURN IN mode comes on the screen of monitor as below.

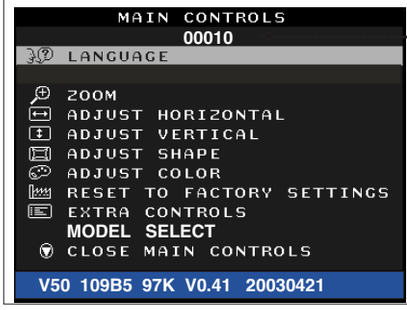
50 seconds around 

5 seconds around 

repeatly

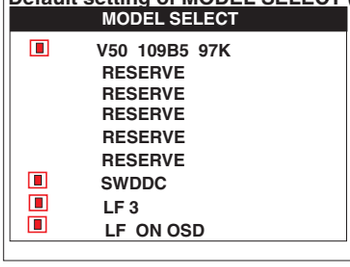
4. **Reconnect the video cable, then return to normal image.**

SERVICE MODE (Indication-Factory mode)

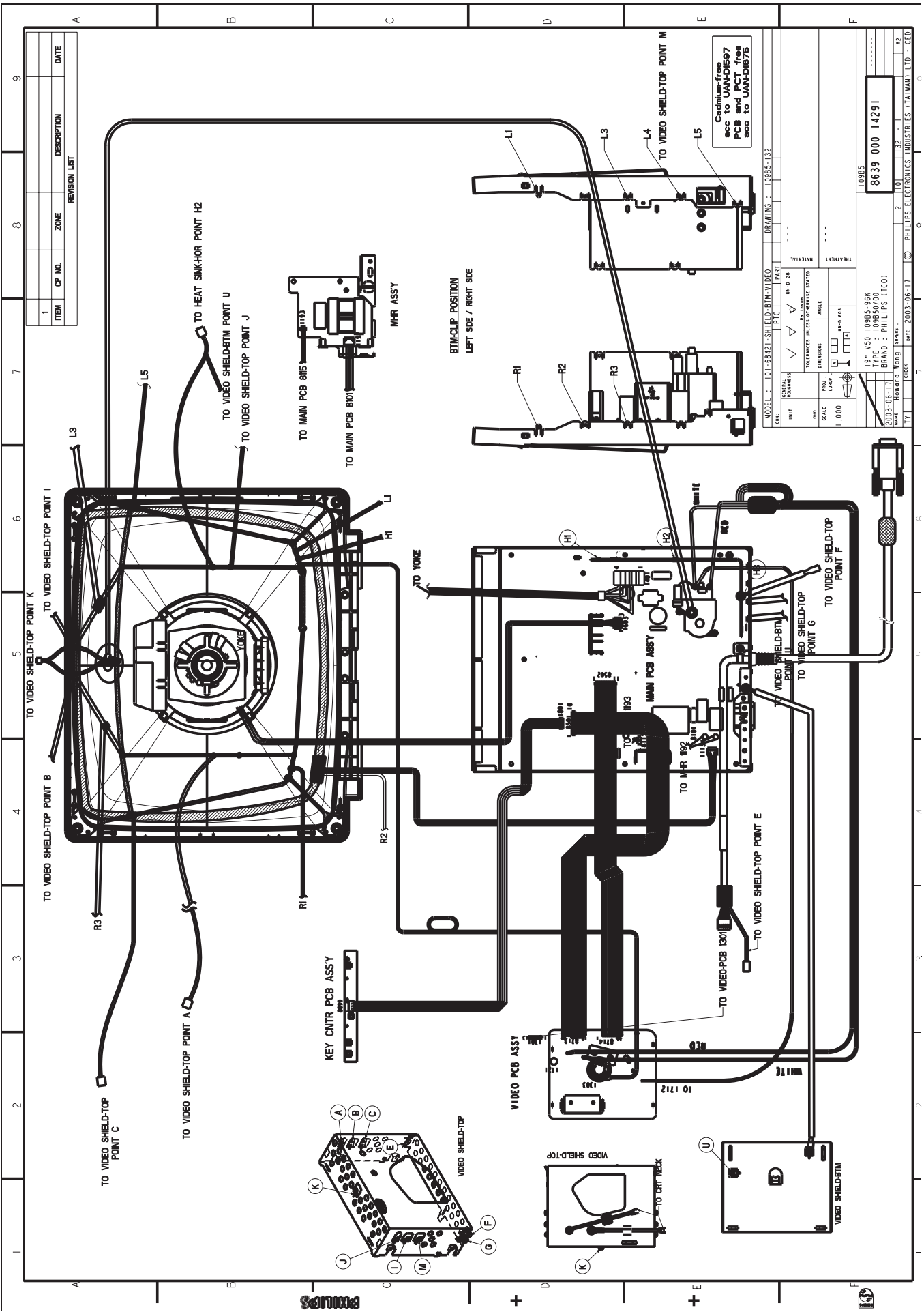


00010: stands for
1. using 10 hours already.
2. turn on/off 10 times.
3. using several hours + turn on/off monitor.

Default setting of MODEL SELECT (Do not change it.)



Wiring Diagram



Mechanical Instructions

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0. General
To be able to perform measurements and repairs on the "circuit boards", these unit should placed in the service position first.

1.Remove the rear cover in Fig. 1.
-Remove 2 screws as shown
-Remove back cover as shown
-Remove pedestal as shown

2. Video panel
- Disconnect the wire between metal shield of Video panel and CRT neck as shown in Fig. 2.
- Disconnect the CRT ground from Video panel.
- Remove screw grounding and grounding wire in Fig. 3.

3.Main board connector in Fig. 4
-Disconnect york wire
-Disconnect rotation connector
-Disconnect control board connector
-Remove Screw for fixed I/F cable
-Remove signal connector
-Remove degaussing wire connector

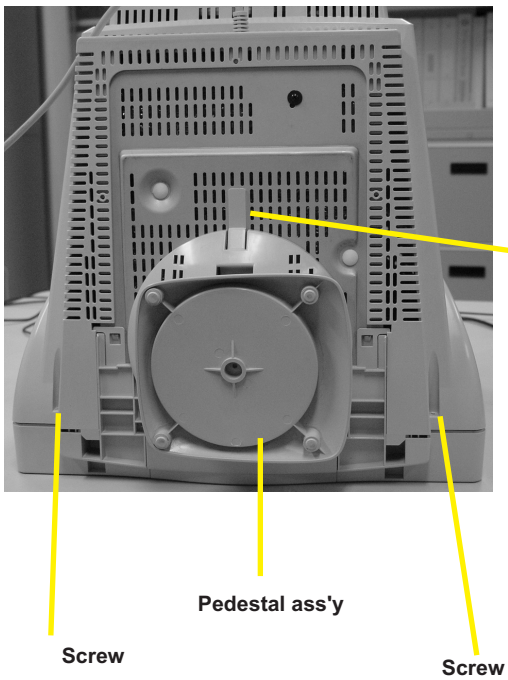

Fig. 1

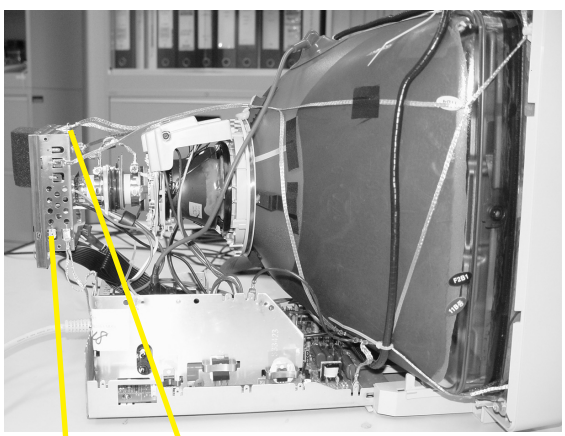

Fig. 2

Fig. 3

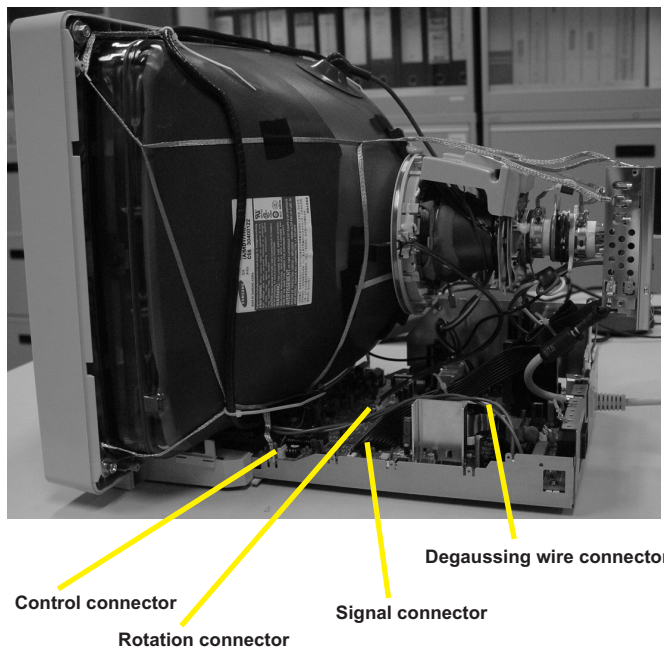

Fig. 4

4. Main panel with Bottom Tray

-Remove 2 screws for disconnect the Bottom tray as Fig. 5.
-Pull the bottom tray on press right and left side clip from fig. 6 to fig. 7.

5. SERVICE POSITION

Reconnect connectors, some wires and panels (chassis), service position can be available for DC/AC measurement as shown in Fig. 8.

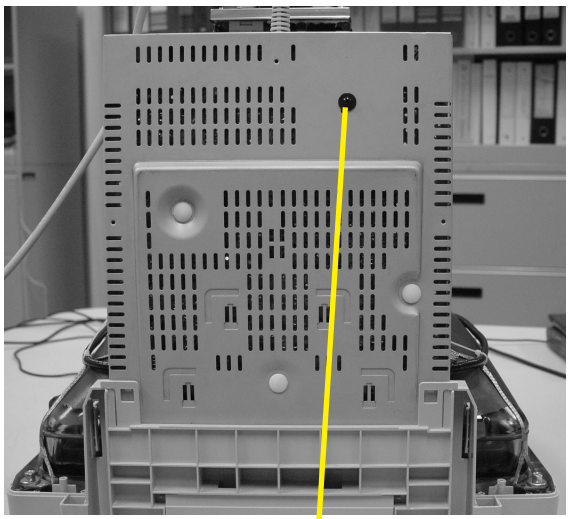

Fig. 5

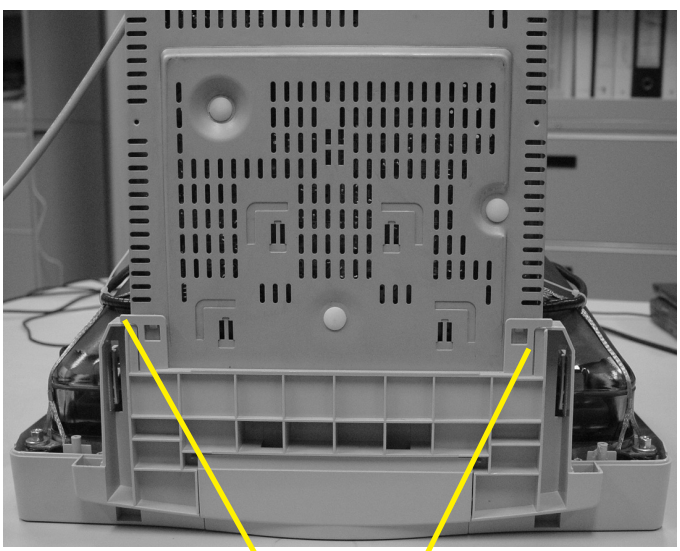

Fig. 6

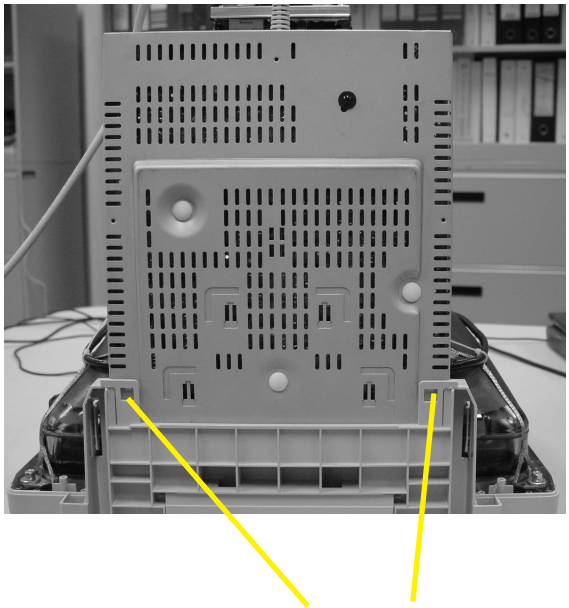

Fig. 7

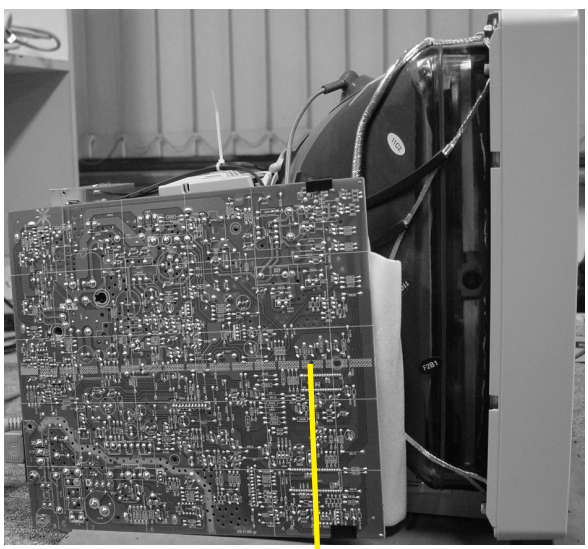

Fig. 8 SERVICE POSITION

Warning and Notes

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Warnings

1. Safety regulations require that the unit should be returned in its original condition and that components identical to the original components are used. The safety components are indicated by the symbol ⚠ .

2. In order to prevent damage to ICs and transistors, all high-voltage flash-overs must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is **0 V** (after approximately 30 seconds).

3. **ESD**
All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten their life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the ground of the unit. Keep components and tools also at this same potential.

4. When repairing a unit, always connect it to the AC Power voltage via an isolating transformer.

5. Be careful when taking measurements in the high-voltage section and on the picture tube panel.

6. It is recommended that saferty goggles be worn when replacing the picture tube.

7. When making adjustments,use plastic rather than metal tools. This will prevent any short-circuit or the danger of a circuit becoming unstable.

8. Never replace modules or other components while the unit is switched on.

9. Together with the defleciton unit, the picture tube is used as an integrated unit. Adjustment of this unit during repair is not recommended.

10. After repair, the wiring should be fastened in place with the cable clamps.

11. All units that are returned for service or repair must pass the original manufactures safety tests.

Notes

1. The direct voltages and waveforms are average voltages. They have been measured using the Service test software and under the following conditions :
   - Mode : 640 * 480 (31.5kHz / 60Hz)
   - Signal pattern : grey scale
   - Adjust brightness and contrast control for the mechanical mid-position (click position)

2. The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

3. The semiconductors indicated in the circuit diagram(s) and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

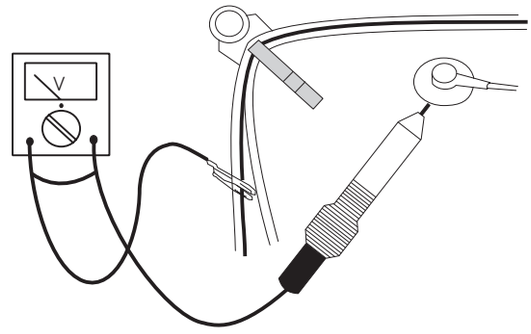


Fig.1

Electrical Adjustments

1. General

2. Input signal mode
Inspection modes : 8

Resolution modes (Inspection timing)	H. freq.	V. freq.	H.	V.
1. 800 x 600	53.7 Khz	85 HZ(VESA)	Don'tCare	
2. 1024 x 768	60.0 Khz	75 HZ(VESA)	Don't Care	
3. 1024 x 768	68.7 Khz	85 HZ(VESA)	Don't Care	
4. 1152 x 864	77.1 Khz	85 HZ(VESA)	Don't Care	
5. 1280 x 1024	80.0 Khz	75 Hz (VESA	Don't Care	
6. 1920 x 1440	90.0 Khz	60 Hz (VES)	Don't Care	
7. 1280 x 1024	91.1 Khz	85 Hz (VESA)	Don't Care	
8. 1600 x 1200	93.8 Khz	75 Hz (VESA)	Don't Care	

3.0 Main chassis alignment
3.1 Power supply adjustment
3.1.1 Set Vg2 manually (screen) to fully counterclockwise (zero beam current).
3.1.2 Apply 80KHz/75Hz full black pattern.
3.1.3 Monitor the following auxiliary voltages.

+197.0V source across C2152 and gnd	+197.7V	+/- 2.5 VDC
+ 82.5V source across C2151	+ 80.5V	+/- 2.0 VDC
+ 6.2V source across C2155	+ 6.2V	+/- 0.35 VDC
+ 12.4V source across C2153	+12.4V	+/- 0.7 VDC
- 12.6V source across C2154	- 12.6V	+/- 0.7 VDC

3.2 High Tension Voltage (EHT) adjustment
3.2.1 Apply 68.7 KHz /85 Hz 1024x768 resolution signal. Adjust manually R3699 (EHT) to obtain 26.00.3KV at CRT anode at zero beam Current.
3.3 Check PF value with MHR function (option)
3.3.1 Apply 91kHz / 85Hz resolution with cross-hatch (contrast Max. / brightness 50%).
3.3.2 Apply input voltage 230VAC, input power consumption about 55W 65W. The PF value about 0.7 0.8 (measure equipment: AC Power Analyzer PM1200).

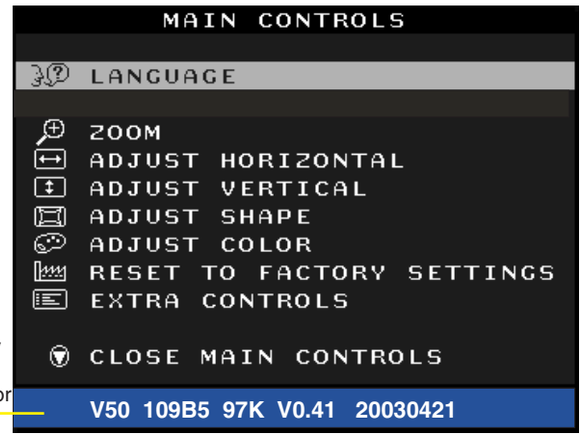
4. General conditions for alignment

4.1 During all alignments, supply a distortion free AC mains voltage to set via an isolating transformer with low internal impedance.
4.2 Align in pre-warmed condition, at least 30 minutes warm-up with nominal picture brightness.
4.3 Purity, geometry and subsequent alignments should be carried out in magnetic cage with correct magnetic field.

Northern hemisphere : H=0, V= 430+/-50 mG, Z=0
Southern hemisphere : H=0, V=-520+/-50 mG, Z=0

4.4 All voltages are to be measured or applied with respect to ground.
Note: Do not use heatsink as ground.
4.5 Adjust brightness controls to center position except for contrast control which should be set to MAX.
4.6 Any external voltage sources should have a low internal impedance.
4.7 Adjust function controls to center position unless otherwise stated.
4.8 The white balance and purity has to be adjusted in dully lighted room.
4.9 All alignments have to be done in a room with a temperature of 25+/- 10° C.

5. To access factory mode
5.1 Turn off monitor (don't turn off PC)
5.2 Press '" ⊖⊕ " and " ⏻ " simultaneously on the front control panel,then press " ⏎ ",wait till the OSD menu with characters V40 109F5 V0.45 20030410 (below OSD menu)" come on the screen of monitor.



5.3 If OSD menu disappears on the screen of monitor, press " ⏎ " again (anytime), then the OSD menu comes on the screen again.
5.4 Using " ⊖⊕ " : to select OSD menu.
5.5 Using " ⊖⊕ " : to increase or decrease the setting.
5.6 Using " ⏎ " to access/confirm the selection.

To leave factory mode

5.7 After alignment of factory mode, turn off monitor (if you do not turn off monitor, the OSD menu is always at the factory mode), then turn on monitor again (at this moment, the OSD menu goes back to user mode).

6. Adjustment of the picture geometry
6.1.1 Apply Table 4 (79.976KHz/75.025Hz) without video signal, set Brightness at 100%, set H-size V-size for raster size around 355x265 mm and set vertical position to 50%, Adjust Raster H and Raster V centering for centered raster via I2C bus.
6.1.2 Adjust the Horizontal Size to 355mm.
6.1.3 Adjust the Horizontal Position to center position.
6.1.4 Adjust the Vertical Size to 265 mm.
6.1.5 Set Vertical Position = 50%, adjust the Raster V for correctly centered vertical video.
6.1.6 Adjust picture tilt (Rotate) for correct TOP/BOTTOM lines. (Picture tube should be mounted without tilt w.r.t. Cabinet)
6.1.7 Adjust pincushion to get optimum vertical line.
6.1.8 Adjust trapezoid to get optimum vertical line.
6.1.9 Adjust balanced pincushion to get optimum vertical line.
6.1.10 Adjust the parallelogram to get optimum vertical line.
6.1.11 Adjust the Top/Bottom corner control to get optimum corner geometry.(6.1.6, 6.1.7, 6.1.8 and 6.1.9 may need to be readjusted)
6.1.12 Store the set result and exit OSD.
(the values for pincushion, trapezoid, balance pincushion and parallelogram can be copied to the other inspection modes to shorten alignment time)
6.2 Other inspection mode geometry adjustment
Use following procedure for all inspection modes (except 68.7kHz/85Hz)(Timing Table 1 - 8)
6.2.1 Adjust the Horizontal Size to 355mm.
6.2.2 Adjust the Horizontal Position to center position.
6.2.3 Adjust the Vertical Size to 265 mm.
6.2.4 Adjust the Vertical Position for correctly centered vertical video.
6.2.5 Adjust pincushion to get optimum vertical line.
6.2.6 Adjust trapezoid to get optimum vertical line.
6.2.7 Adjust balanced pincushion to get optimum vertical line.
6.2.8 Adjust the parallelogram to get optimum vertical line.
(6.2.5, 6.2.6, 6.2.7 and 6.2.8 may need some iteration)
6.2.9 Store the set result and exit OSD.

Electrical Adjustments (Continued)

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7. Alignment of Vg2 cut-off point, white tracking

Equipment : 1. Video Test Generator-801GC (Quantum Data)
2. Color-analyzer (Minolta CA-100)

Adjustment mode: 68.67KHz/85Hz with correctly adjusted video size 355x265mm Use color-analyzer (Minolta CA-100) to adjust cut-off and white balance.Before alignment, set initial data as below (all values show on factory OSD):
Brightness=50%, Sub-Contrast=85%, ABL=70% (I^2C)
9300K
R cut-off = **40**%, R gain = 65% (I^2C)
G cut-off = **40**% , G gain = 55% (I^2C)
B cut-off = **40**%, B gain = 65% (I^2C)
6500K
R cut-off = **40**% , R gain = 55% (I^2C)
G cut-off = **40**%, G gain = 65% (I^2C)
B cut-off = **40**% , B gain = 55% (I^2C)
5500K
R cut-off = **40**%, R gain = 55% (I^2C)
G cut-off = **40**%, G gain = 55% (I^2C)
B cut-off = **40**%, B gain = 55% (I^2C)
Setting RGB cut-off = 50% at 9300K,6500K,5500K only for SDI tube.Vg2 (screen) to fully counterclockwise (zero beam current).(Manual)

Step 1: To access factory mode

- Turn off monitor (don't turn off PC)
- Press " ⊖⊕ " and " ⏻ " simultaneously on the front control panel,then press " adj ",wait till the OSD menu with characters V40 109S5 V0.45 20030410 (below OSD menu)" comes on the screen of monitor as shown in Fig. 2.1.

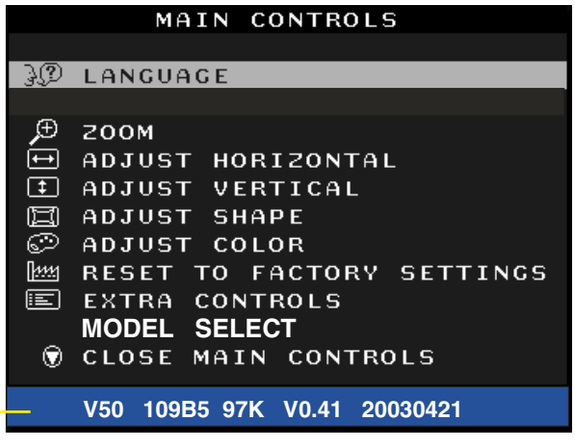

Fig. 2.1

- If OSD menu disappears on the screen of monitor, press " adj " again (anytime), then the OSD menu comes on the screen again.
- Using " ▼ " to select V50 109B5 97K V0.41 20030421.
- Press " adj " button to access/confirm the selection.
Bring up the "function adjustment" as shown in Fig. 2.2.
- Press '" ⊖⊕ " button for function selection as shown in Fig. 2.2.
- Press " adj " button to access/confirm each item selection (The cursor indicator will be changed from yellow colour to red colour.)
- Using " ⊖⊕ " : to increase or decrease the value.

9300 BIAS R G B GAIN R G B	(for ref. 75,107,116,218,174,161)
6500 BIAS R G B GAIN R G B	(for ref. 80,110,117,206,141,93)
5500 BIAS R G B GAIN R G B	(for ref. 86,112,118,206,121,56)
SRGB BIAS R G B GAIN R G B	(for ref. 89,115,124,145,85,40)
SRGB (☼ ◑) OSD ◑	(for ref. 128,255,180)
FOCUS(H V) VLINBAL USER	(for ref. 0,140,100,50)
RASTER (H V) LIN(H V) SUB	(for ref. 79,127,255,120,50)
V(OFFSET GAIN) SUB ◑	(for ref. 128,220,184)
SUB VPOSITION	(for ref. 220)
CORNER(T B) ABL SUB ☼	(for ref. 35,50,88,255)
LF(BRIGH SHARP)	(for ref. 3,3)
EXIT	

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Fig. 2.2

(for example: 75 is value of "BIAS R")

BIAS R G B : R(red) G(green) B(blue) cutoff
GAIN R G B : R(red) G(green) B(blue) gain
OSD contrast : OSD window contrast
V OFFSET : Vertical raster center
V GAIN : Vertical size center
VLIN BAL : Vertical Linearity Balance
V FOCUS : Vertical Focus adiustment
T CORNER: Corner Correctionof TOP
B CORNER: Corner Correctionof BOTTOM
EHT H : Horizontal Size compensation
ABL : Auto brightness Limitation
SUB ◑ : Sub Contrast allowance range
SUB ☼ : Sub Brigntness allowance range
SUB ▭ : Horizontal size range adjustment range
HLIN : Horizontal Linearity
V LIN : Vertical Linearity
RANGE : Zoom range

7.2 Setup A, manually increase Vg2 voltage until brightest color reaches 100 scale
7.3 Setup A, adjust R/G/B cut-off (I^2C) for all colors at 100 +/- 7Scale
7.4 Setup B, adjust sub-contrast (I^2C) for RGB readings around 100, then adjust RGB gain for all colors at 100 +/- 2 scale.
7.5 Repeat 5.3.2, 5.3.3 (RGB cut-off and gain) to get both low and high 9300 scales at 100(0.10FL+/- 0.05FL for low scaale; 41FL+/- 1FL for high scale. x/y tolerance +/-0.005)
7.6 Setup C, adjust R/G/B cut-off (I^2C) for all colors at 100 +/- 7 scale
7.7 Setup D, adjust RGB gain for all colors at 100 +/- 2 scale.
7.8 Repeat 5.3.5, 5.3.6 (RGB cut-off and gain) to get both low and high 6500 scales at 100 (0.10FL+/-0.05FL for low scale, 35FL+/-1FL for high scale. x/y tolerance+/- 0.005)
7.9 Setup E, adjust R/G/B cut-off (I^2C) for all colors at 100 +/- 7 scale
7.10 Setup F, adjust RGB gain for all colors at 100 +/- 2 scale.
7.11 Repeat 5.3.8, 5.3.9 (RGB cut-off and gain) to get both low and high 5500 scales at 100 (0.10FL+/-0.05FL for low scale, 32FL+/-1FL for high scale. x/y tolerance +/-0.005)
7.12 Setup G, Adjust ABL (I^2C) for 30FL+/- 0.5FL
7.13 Apply full white pattern, sRGB: sRGB cutoff and gain are same as 6500 color temperature. Setting brightness at 50%, then set sRGB contrast at 23 +/- 1 FL.

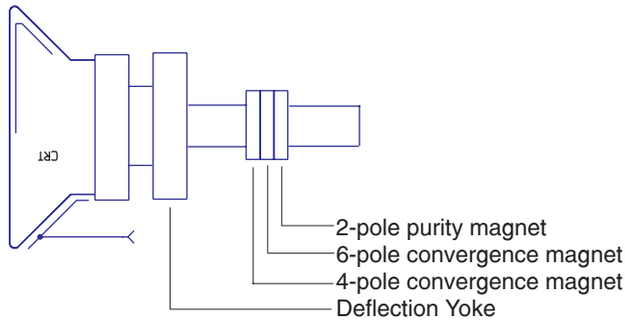
Electrical Adjustments (Continued)

8. Focus adjustment

With 9-blocks ME pattern display at timing 79.9KHz 1280 X 1024, each block is a square of 90mm x 90mm. Set brightness at 50% and contrast at 100% at the center of the screen. and adjust focus pot-meter which is located at fly-back transformer, until the haze just disappears on 2/3 east and west, top and down of the screen.

9. Loading DDC code

The DDC HEX data should be written into the EEPROM (7802) by EDID301.EXE Program(3138 106 10103) and software DDC Alignment kits (4822 310 11184).



10. Purity adjustment

- Make sure the monitor is not exposed to any external magnetic field.
- Produce a full red pattern on the screen, adjust the purity magnet rings on the PCM assy (on CRT) to obtain a complete field of the color red. This is done by moving the two tabs (2-pole) in such a manner that they advance in an opposite direction but at the same time to obtain the same angle between the two tabs, which should be approximately 180 degree.
- Check by full green pattern and full blue pattern again to observe their respective color purity.

11. Static convergence

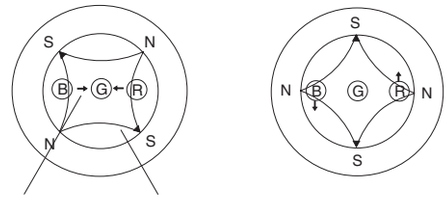
Introduction

Slight deviation in the static convergence can be corrected by using two permanent pairs of magnets which are fitted around the neck of the CRT. These are the 4-pole magnet and the 6-pole magnet.
The 4-pole magnet move the outermost electron beams (R and B) parallel in the opposite direction from the other. The 6-pole magnet moves the outermost electron beam (R, B and G) parallel in the opposite direction from the other.
The magnetic field of the above magnets do not affect the center of the CRT neck.

Setting

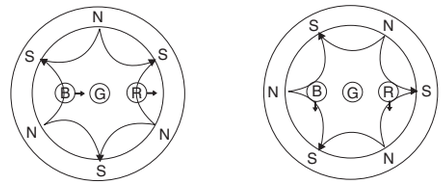
- Before the static convergence setting can be made, the monitor must be switched on for 30 minutes.
- The focus setting must be made correctly.
- Signal: 640 * 480, 31.5 kHz/60 Hz mode.
- Set the tabs of the 4-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R and B electron beams.
- Set the tabs of the 6-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R, B, and G electron beams.
- First set the 4-pole magnet optimally.
- Then set the 6-pole magnet optimally.
- If the convergence is not now optimal, then adjust to the optimal setting with the 4-pole magnet and then with the 6- Pole magnet again.
- Set the tabs of the 6-pole magnet in the neutral position. This is when the tabs are opposite one another. In this position the magnets do not affect the deflection of the R, B, and G electron beams.
- First set the 4-pole magnet optimally.
- Then set the 6-pole magnet optimally.
- If the convergence is not now optimal, then adjust to the optimal setting with the 4-pole magnet and then with the 6- pole magnet again.

4-pole — Beam motion producced by the 4-pole convergence magnet



Beam displacement direction — Magnetic flux lines

6-pole — Beam motion producced by the 6- pole convergence magnet



DDC Instructions

Go to cover page

1. General

DDC Data Re-programming

In case the main EEPROM with Software DDC which store all factory settings were replaced because a defect,repaired monitor the serial numbers have to be re-programmed.

It is advised to re-soldered the main EEPROM with Software DDC from the old board onto the new board if circuit board have been replaced, in this case the DDC data does not need to be re-programmed.

Additional information

Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA). Extended Display Identification Data(EDID) information may be also obtained from VESA.

DDC EDID structure
For the monitor : Standard Version 3.0
Structure Version 1.2

2. System and equipment requirements

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98.
3. EDID301.EXE program (3138 106 10103) shown as Fig. 1
4. Software DDC Alignment kits (4822 310 11184) shown as Fig. 2.

The kit contents: a. Alignment box x1
b. Printer cable x1
c. D-Sub cable x1

Note: The EDID301.EXE (Release Version 1.58, 20000818)is a windows-based program, which cannot be run in MS-DOS.

Figure 1 Diskette with EDID301.EXE

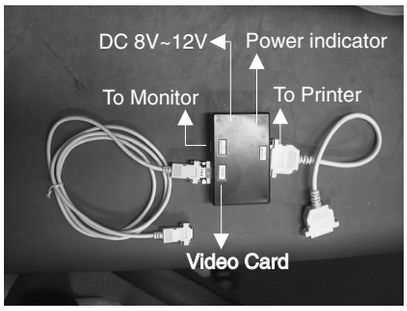
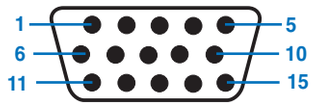


Fig. 2 Alignment Kits

3. Pin assignment

A. 15-pin D-Sub Connector

The 15-pin D-sub connector (male) of the signal cable on the 3rd row for DDC feature :



Pin No.	Assignment	Pin No.	Assignment
1	Red video input	9	DDC 5V
2	Green video input	10	Sync. Ground
3	Blue video input	11	Ground
4	Ground	12	Bi-directional data(SDA)
5	for selftest(PC ground)	13	H.Sync
6	Red video ground	14	V.Sync(VCLK)
7	Green video ground	15	Data clock line(SCL)
8	Blue video ground		

DDC Instructions (Continued)

4. Configuration and procedure

There is no Hardware DDC (DDC IC) anymore. Main EEPROM stores all factory settings and DDC data (EDID code) which is so called Software DDC. The following section describes the connection and procedure for Software DDC application. The main EEPROM can be re-probrammed by enabling "factory memory data write" function on the DDC program (EDID301.EXE).

***** INITIALIZE ALIGNMENT BOX *****

In order to avoid that monitor entering power saving mode due to sync will cut off by alignment box, it is necessary to initialize alignment box before re-programming DDC Data. Following steps show you the procedures and connection.

Step 1: Supply 8~12V DC power source to the Alignment box by plugging a DC power cord or using batteries.
Step 2: Connecting printer cable and video cable of monitor as shown in Fig.3.

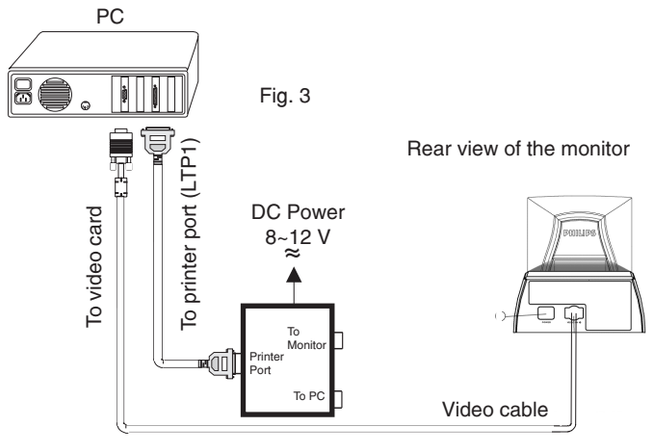


Fig. 3

Step 3: Installation of EDID301.EXE

Method 1: Start on DDC program

Start Microsoft Windows.
1. Insert the disk containing EDID301.EXE program into floppy disk drive.
2. Click Start , choose Run at start menu of Windows 95/98 as shown in Fig. 4.

Fig. 4

3. At the submenu, type the letter of your computer's floppy disk drive followed by :EDID301 (for example, A:\EDID301, as shown in Fig. 5).

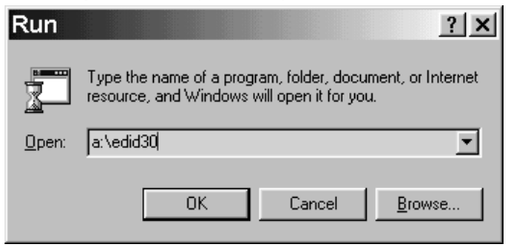


Fig. 5

4. Click **OK** button. The main menu appears (as shown in Fig. 6).
This is for initialize alignment box.

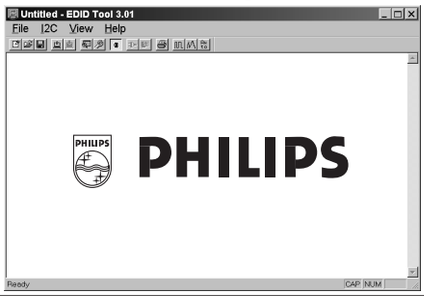


Fig. 6

Note 1: If the connection is improper, you will see the following error message (as shown in Fig. 7) before entering the main menu. Meanwhile, the (read EDID) function will be disable. At this time, please make sure all cables are connected correctly and fixedly, and the procedure has been performed properly.

Fig. 7

Method 2: After create a shortcut of EDID301.EXE
: Double click EDID301 icon (as shown in Fig. 8) which is on the screen of Windows Wallpaper.
Bring up main menu of EDID301 as shown in Fig. 9.
This is for initialize alignment box.

Fig. 8

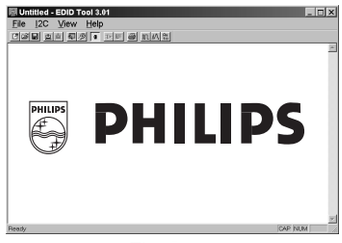


Fig. 9

Note 2: During the loading, EDID301 will verify the EDID data which just loaded from monitor before proceed any further function, once the data structure of EDID can not be recognized, the following error message will appear on the screen as below. Please confirm following steps to avoid this message.
1. The data structure of EDID was incorrect.
2. DDC IC that you are trying to load data is empty.
3. Wrong communication channel has set at configuration setup windows.
4. Cables loosed or poor contact of connection.

DDC Instructions (Continued)

Re-programming EEPROM (Software DDC)

Step 1: After initialize alignment box, connecting all cables and box as shown in Fig. 10

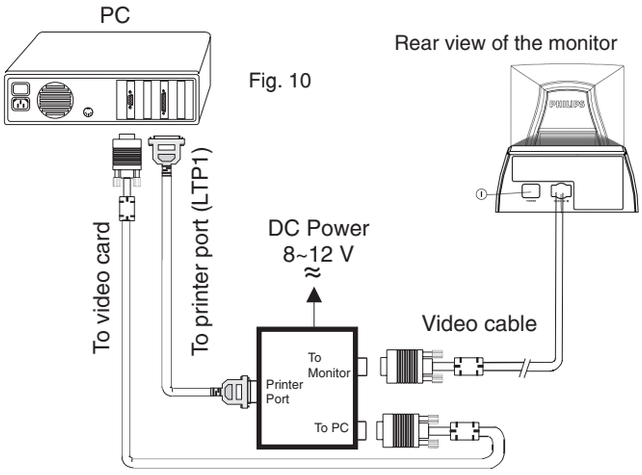


Fig. 10

Step 2: Read DDC data from monitor

1-1 Click the left key of Mouse, or hit any key on the keyboard, then the characters disappear from the screen.
1-2 Click icon as shown if Fig. 11 from the tool bar to bring up the "Configuration Setup" windows as shown in Fig. 12.

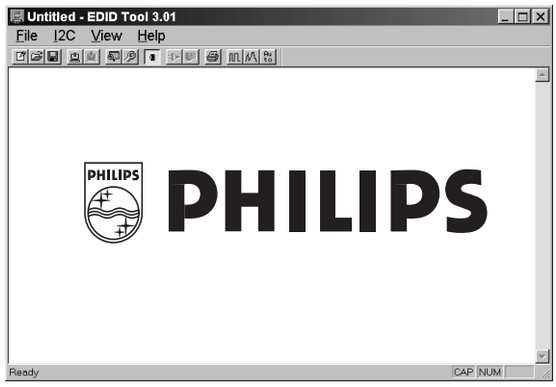


Fig. 11

2. Select the DDC2B as the communication channel. Select "**Enable**" & fill out "**F0**" for Mapped EDID page address as shown in Fig. 12.

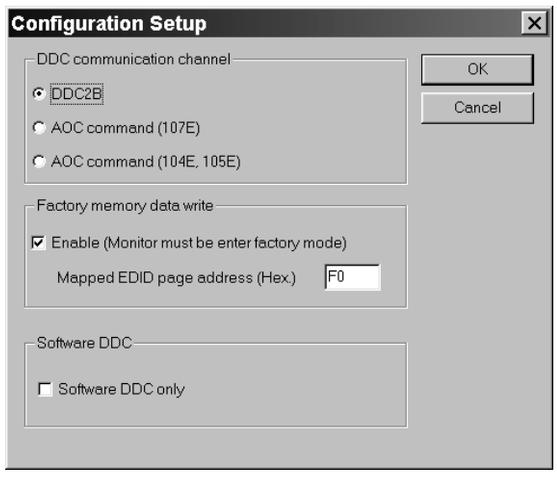


Fig. 12

3. Click OK button to confirm your selection.

4. Click icon (Read EDID function) to read DDC EDID data from monitor. The EDID codes will display on screen as shown in Fig. 13.

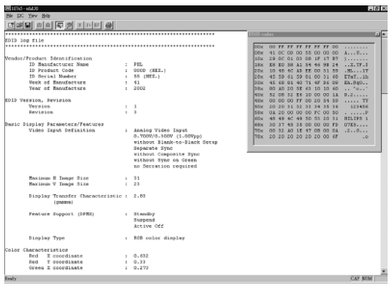


Fig. 13

Step 3: Modify DDC data (verify EDID version, week, year)

1. Click (new function) icon from the tool bar, bring up Step 1 of 9 as shown in Fig. 14 .
EDID301 DDC application provides the function selection and text change (select & fill out) from Step 1 to Step 9.

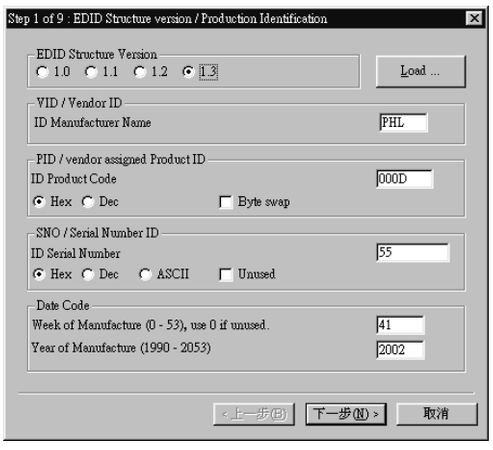


Fig. 14

Step 4: Modify DDC data (Monitor Serial No.)

1. Click **Next** till the Step 7 of 9 window appears as shown in Fig. 15.
2. Fill out the new Serial No. (for example, TY 503960, TY 123456).
3. Click **Next** till the last step window appears, then click **Finish** to exit the Step window.

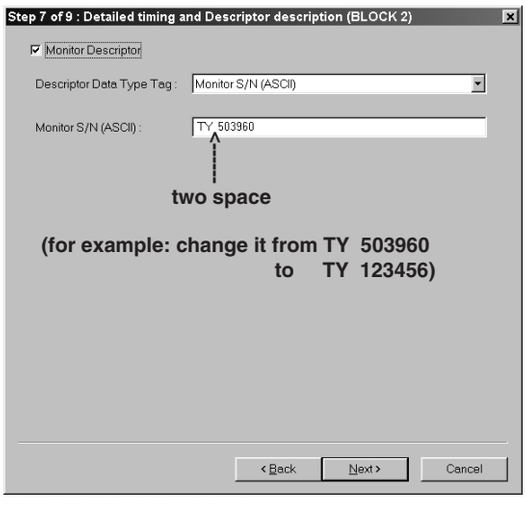
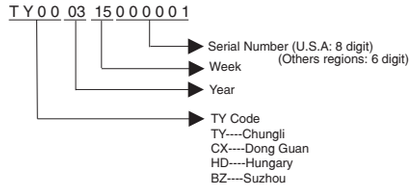


Fig. 15

Definition of Serial Number (barcode format)



DDC Instructions (Continued)

Step 5: **Configuration Setup & Enter Factory Mode **
for "write EDID data"

1. Click icon from the tool bar to bring up the Configuration Setup windows again. Then, select "Software DDC only" as shown in Fig. 16. Click "OK".

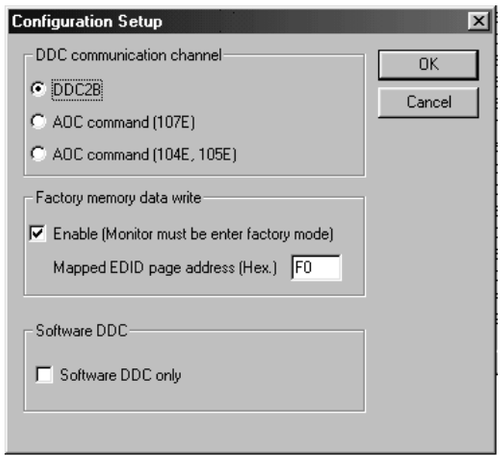


Fig. 16

If you do not select "Software DDC only", when you execute "write EDID", it will bring up an error message as below.

To access factory mode

1. Turn off monitor (don't turn off PC)
2. Press " ⊖ ⊕ " and " ⏻ " simultaneously on the front control panel,then press " OK ",wait till the OSD menu with characters V5040 109B5 97K V0.41 20030421 (below OSD menu)" come on the screen of monitor.

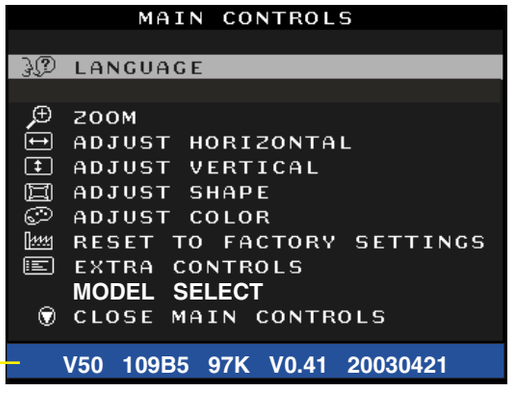


Fig. 17

Factory Mode Indicator

If OSD menu disappears on the screen of monitor, press " OK " again (anytime), then the OSD menu comes on the screen again.

If you do not access "Factory mode", when you execute "write EDID", it will bring up an error message as below.

Step 6: Write DDC data

1. Click (Write EDID) icon from the tool bar to write DDC data. Bring up "Writing 0%~100%, ready" a progressing bar on the left down corner.
2. Click (Read EDID) to confirm it.

Step 7: Confirm Serial Number in User Mode

1. Press the ⏻ button to turn off the monitor. Press the ⏻ button again to turn on the monitor.
2. Press the OK button to bring up the OSD Main Menu.
3. Press the ⊕ button to select Extra Controls, press the OK button to confirm your selection.
4. Confirm the Serial Number "123456" is updated as shown in Fig. 18.

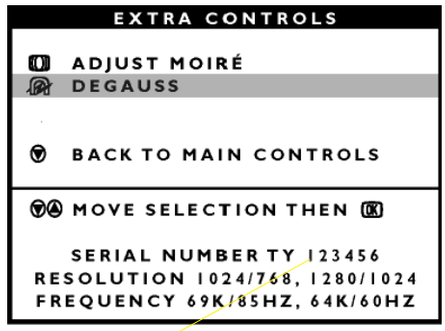


Fig. 18

Step 8: Save DDC data

Sometimes, you may need to save DDC data as a text file for using in other IC chip. To save DDC data, follow the steps below:

1. Click (Save) icon (or click "file"-> "save as") from the tool bar and give a file name as shown in Fig. 19.
The file type is EDID301 file (*.ddc) which can be open in WordPad. By using WordPad, the texts of DDC data & table (128 bytes, hex code) can be modified. If DDC TEXTS & HEX Table are completely correct, it can be saved as .ddc flie to re-load it into EEPROM for DDC Data application.

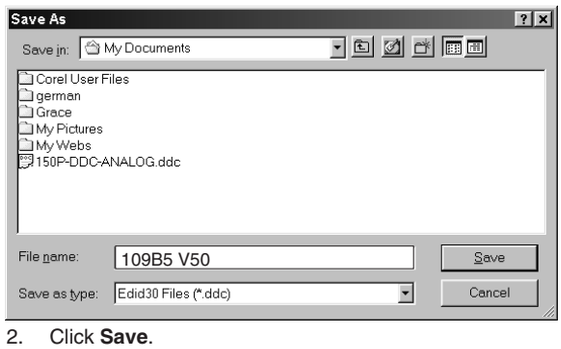


Fig. 19

2. Click **Save**.

DDC Instructions (Continued)

Go to cover page

Step 9: Load DDC data

1. Click  from the tool bar.
2. Select the file you want to open as shown in Fig. 20.
3. Click **Open**.
4. Access "Factory Mode" and enable "Software DDC only" as shown in Fig. 17 & Fig. 16.
5. Write EDID (click ).

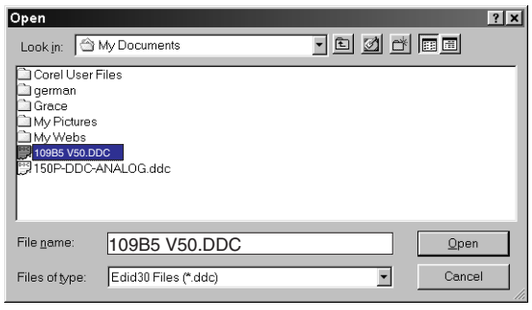


Fig. 20

Step 10: Exit DDC program

Pull down the File menu and select Exit as shown in Fig. 21.
(EDID Tool 3.01)

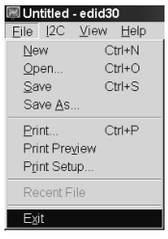


Fig. 21

Note1 : In User Mode: Read DDC data only

Before read EDID code, please confirm that the **Software DDC only was disabled** as shown in Fig. 22.

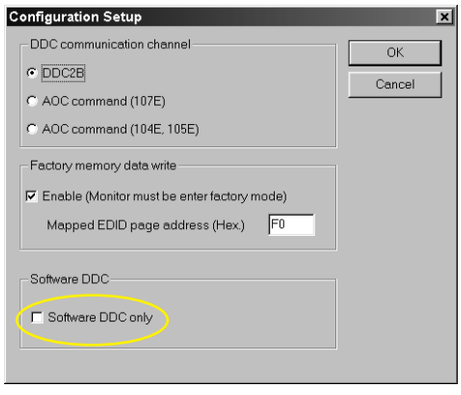
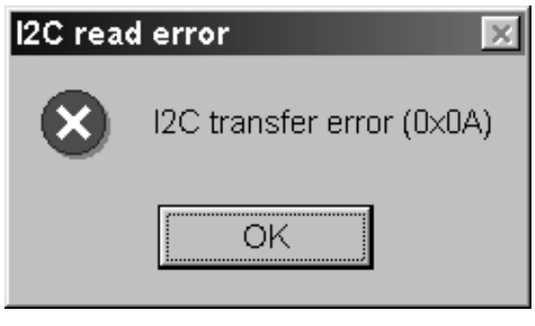


Fig. 22

If you do not disable "Software DDC only", when you execute "read EDID", it will bring up an error message as below.



Note 2 : In Factory Mode: Read/Write DDC data

Before Read/Write EDID code, please confirm that the **Software DDC only was enabled** as shown in Fig. 23.

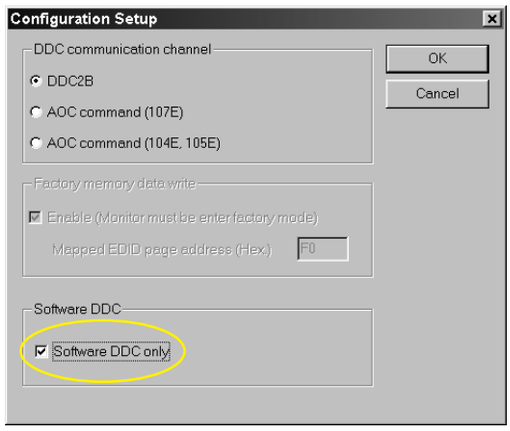


Fig. 23

Hex Data of DDC2B

****
EDID log file for SDI tube
****

Vendor/Product Identification
- ID Manufacturer Name : PHL
- ID Product Code : E018 (HEX.)
- ID Serial Number : 12345 (DEC.)
- Week of Manufacture : 33
- Year of Manufacture : 2003

EDID Version, Revision
- Version : 1
- Revision : 3

Basic Display Parameters/Features
- Video Input Definition : Analog Video Input
  0.700V/0.000V (0.70Vpp)
  without Blank-to-Black Setup
  Separate Sync
  without Composite Sync
  without Sync on Green
  no Serration required
- Maximum H Image Size : 36
- Maximum V Image Size : 27
- Display Transfer Characteristic (gamma) : 2.9
- Feature Support (DPMS) : Standby
  Suspend
  Active Off
- Display Type : RGB color display
- Standard Default Color Space : Primary color space
- Preferred Timing Mode : Detailed timing block 1

Color Characteristics
- Red X coordinate : 0.639
- Red Y coordinate : 0.323
- Green X coordinate : 0.275
- Green Y coordinate : 0.597
- Blue X coordinate : 0.143
- Blue Y coordinate : 0.062
- White X coordinate : 0.283
- White Y coordinate : 0.297

Established Timings
- Established Timings I : 720 x 400 @70Hz (IBM,VGA)
  720 x 400 @88Hz (IBM,XGA2)
  640 x 480 @60Hz (IBM,VGA)
  640 x 480 @67Hz (Apple,Mac II)
  640 x 480 @72Hz (VESA)
  640 x 480 @75Hz (VESA)
  800 x 600 @56Hz (VESA)
  800 x 600 @60Hz (VESA)
- Established Timings II : 800 x 600 @72Hz (VESA)
  800 x 600 @75Hz (VESA)
  832 x 624 @75Hz (Apple,Mac II)
  1024 x 768 @87Hz (IBM)
  1024 x 768 @60Hz (VESA)
  1024 x 768 @70Hz (VESA)
  1024 x 768 @75Hz (VESA)
  1280 x 1024 @75Hz (VESA)
- Manufacturer's timings : 1152 x 870 @75Hz (Apple,Mac II)

Standard Timing Identification #1
- Horizontal active pixels : 640
- Aspect Ratio : 4:3
- Refresh Rate : 85

Standard Timing Identification #2
- Horizontal active pixels : 800
- Aspect Ratio : 4:3
- Refresh Rate : 85

Standard Timing Identification #3
- Horizontal active pixels : 1024
- Aspect Ratio : 4:3
- Refresh Rate : 85

Standard Timing Identification #4
- Horizontal active pixels : 1280
- Aspect Ratio : 5:4
- Refresh Rate : 85

Standard Timing Identification #5
- Horizontal active pixels : 1600
- Aspect Ratio : 4:3
- Refresh Rate : 75

Standard Timing Identification #6
- Horizontal active pixels : 1920
- Aspect Ratio : 4:3
- Refresh Rate : 60

Detailed Timing #1
- Pixel Clock (MHz) : 202.5
- H Active (pixels) : 1600
- H Blanking (pixels) : 560
- V Active (lines) : 1200
- V Blanking (lines) : 50
- H Sync Offset (F Porch) (pixels): 64
- H Sync Pulse Width (pixels): 192
- V Sync Offset (F Porch) (lines) : 1
- V Sync Pulse Width (lines): 3
- H Image Size (mm) : 360
- V Image Size (mm) : 270
- H Border (pixels) : 0
- V Border (lines) : 0
- Flags : Non-interlaced
  : Normal Display, No stereo
  : Digital Separate sync.
  : Positive Vertical Sync.
  : Positive Horizontal Sync.

Monitor Descriptor #2
- Serial Number : TY 123456

Monitor Descriptor #3
- Monitor Name : PHILIPS 109B5

Monitor Descriptor #4
- Monitor Range Limits
- Min. Vt rate Hz : 50
- Max. Vt rate Hz : 160
- Min. Horiz. rate kHz : 30
- Max. Horiz. rate kHz : 97
- Max. Supported Pixel : 240

No secondary GTF timing formula supported.

Extension Flag : 0

Check sum : 49 (HEX.)

****
EDID data (128 bytes)
****

```
 0: 00  1: ff  2: ff  3: ff  4: ff  5: ff  6: ff  7: 00
 8: 41  9: 0c 10: 18 11: e0 12: 39 13: 30 14: 00 15: 00
16: 21 17: 0d 18: 01 19: 03 20: 68 21: 24 22: 1b 23: be
24: ee 25: bb 26: b8 27: a3 28: 52 29: 46 30: 98 31: 24
32: 0f 33: 48 34: 4c 35: ff 36: ff 37: 80 38: 31 39: 59
40: 45 41: 59 42: 61 43: 59 44: 81 45: 99 46: a9 47: 4f
48: d1 49: 40 50: 01 51: 01 52: 01 53: 01 54: 1a 55: 4f
56: 40 57: 30 58: 62 59: b0 60: 32 61: 40 62: 40 63: c0
64: 13 65: 00 66: 68 67: 0e 68: 11 69: 00 70: 00 71: 1e
72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59
80: 20 81: 20 82: 31 83: 32 84: 33 85: 34 86: 35 87: 36
88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50
96: 48 97: 49 98: 4c 99: 49 100: 50 101: 53 102: 20 103: 31
104: 30 105: 39 106: 42 107: 35 108: 00 109: 00 110: 00 111: fd
112: 00 113: 32 114: a0 115: 1e 116: 61 117: 18 118: 00 119: 0a
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 49
```

Hex Data of DDC2B

```
**************************************************************************
                          EDID log file   LG
**************************************************************************

Vendor/Product Identification
        ID Manufacturer Name      : PHL
        ID Product Code           : E018 (HEX.)
        ID Serial Number          : 12345 (DEC.)
        Week of Manufacture       : 33
        Year of Manufacture       : 2003
EDID Version, Revision
        Version                   : 1
        Revision                  : 3
Basic Display Parameters/Features
        Video Input Definition    : Analog Video Input
                                    0.700V/0.000V (0.70Vpp)
                                    without Blank-to-Black Setup
                                    Separate Sync
                                     without Composite Sync
                                     without Sync on Green
                                     no Serration required
        Maximum H Image Size      : 36
        Maximum V Image Size      : 27
        Display Transfer Characteristic : 3.03
                  (gamma)
        Feature Support (DPMS)    : Standby
                                     Suspend
                                     Active Off
        Display Type              : RGB color display
        Standard Default Color Space:  Primary color space
        Preferred Timing Mode     : Detailed timing block 1
Color Characteristics
        Red   X coordinate        : 0.638
        Red   Y coordinate        : 0.327
        Green X coordinate        : 0.28
        Green Y coordinate        : 0.602
        Blue  X coordinate        : 0.142
        Blue  Y coordinate        : 0.063
        White X coordinate        : 0.283
        White Y coordinate        : 0.297
Established Timings
        Established Timings I  : 720 x 400 @70Hz (IBM,VGA)
                                 720 x 400 @88Hz (IBM,XGA2)
                                 640 x 480 @60Hz (IBM,VGA)
                                 640 x 480 @67Hz (Apple,Mac II)
                                 640 x 480 @72Hz (VESA)
                                 640 x 480 @75Hz (VESA)
                                 800 x 600 @56Hz (VESA)
                                 800 x 600 @60Hz (VESA)
        Established Timings II  : 800 x 600 @72Hz (VESA)
                                  800 x 600 @75Hz (VESA)
                                  832 x 624 @75Hz (Apple,Mac II)
                                  1024 x 768 @87Hz (IBM)
                                  1024 x 768 @60Hz (VESA)
                                  1024 x 768 @70Hz (VESA)
                                  1024 x 768 @75Hz (VESA)
                                  1280 x 1024 @75Hz (VESA)
        Manufacturer's timing :  1152 x 870 @75Hz (Apple,Mac II)
Standard Timing Identification #1
        Horizontal active pixels  : 640
        Aspect Ratio              : 4:3
        Refresh Rate              : 85
Standard Timing Identification #2
        Horizontal active pixels  : 800
        Aspect Ratio              : 4:3
        Refresh Rate              : 85

Standard Timing Identification #3
        Horizontal active pixels  : 1024
        Aspect Ratio              : 4:3
        Refresh Rate              : 85

Standard Timing Identification #4
        Horizontal active pixels  : 1280
        Aspect Ratio              : 5:4
        Refresh Rate              : 85

Standard Timing Identification #5
        Horizontal active pixels  : 1600
        Aspect Ratio              : 4:3
        Refresh Rate              : 75

Standard Timing Identification #6
        Horizontal active pixels  : 1920
        Aspect Ratio              : 4:3
        Refresh Rate              : 60

Detailed Timing #1
        Pixel Clock (MHz)         : 202.5
        H Active (pixels)         : 1600
        H Blanking (pixels)       : 560
        V Active (lines)          : 1200
        V Blanking (lines)        : 50
        H Sync Offset (F Porch) (pixels): 64
        H Sync Pulse Width (pixels): 192
        V Sync Offset (F Porch) (lines) : 1
        V Sync Pulse Width (lines): 3
        H Image Size (mm)         : 360
        V Image Size (mm)         : 270
        H Border (pixels)         : 0
        V Border (lines)          : 0
        Flags                     : Non-interlaced
                                  : Normal Display, No stereo
                                  : Digital Separate sync.
                                  : Positive Vertical Sync.
                                  : Positive Horizontal Sync.

Monitor Descriptor #2
        Serial Number             :  TY  123456

Monitor Descriptor #3
        Monitor Name              : PHILIPS 109B5

Monitor Descriptor #4
        Monitor Range Limits
        Min. Vt rate Hz           : 50
        Max. Vt rate Hz           : 160
        Min. Horiz. rate kHz      : 30
        Max. Horiz. rate kHz      : 97
        Max. Supported Pixel      : 240

        No secondary GTF timing formula supported.

Extension Flag                    : 0

Check sum                         : D6 (HEX.)
```

Hex Data of DDC2B

```
**********************************************************************
                        EDID log file   CPT tube
**********************************************************************
Vendor/Product Identification
        ID Manufacturer Name     : PHL
        ID Product Code          : E018 (HEX.)
        ID Serial Number         : 3039 (HEX.)
        Week of Manufacture      : 33
        Year of Manufacture      : 2003
EDID Version, Revision
        Version                  : 1
        Revision                 : 3
Basic Display Parameters/Features
        Video Input Definition   : Analog Video Input
                                   0.700V/0.000V (0.70Vpp)
                                   without Blank-to-Black Setup
                                   Separate Sync
                                   without Composite Sync
                                   without Sync on Green
                                   no Serration required
        Maximum H Image Size     : 36
        Maximum V Image Size     : 27
        Display Transfer Characteristic : 2.81
                (gamma)
        Feature Support (DPMS)   : Standby
                                   Suspend
                                   Active Off
        Display Type             : RGB color display
        Standard Default Color Space   : Primary color space
        Preferred Timing Mode    : Detailed timing block 1
Color Characteristics
        Red   X coordinate       : 0.631
        Red   Y coordinate       : 0.329
        Green X coordinate       : 0.276
        Green Y coordinate       : 0.6
        Blue  X coordinate       : 0.143
        Blue  Y coordinate       : 0.057
        White X coordinate       : 0.283
        White Y coordinate       : 0.297
Established Timings
        Established Timings I    : 720 x 400 @70Hz (IBM,VGA)
                                   720 x 400 @88Hz (IBM,XGA2)
                                   640 x 480 @60Hz (IBM,VGA)
                                   640 x 480 @67Hz (Apple,Mac II)
                                   640 x 480 @72Hz (VESA)
                                   640 x 480 @75Hz (VESA)
                                   800 x 600 @56Hz (VESA)
                                   800 x 600 @60Hz (VESA)
        Established Timings II   : 800 x 600 @72Hz (VESA)
                                   800 x 600 @75Hz (VESA)
                                   832 x 624 @75Hz (Apple,Mac II)
                                   1024 x 768 @87Hz (IBM)
                                   1024 x 768 @60Hz (VESA)
                                   1024 x 768 @70Hz (VESA)
                                   1024 x 768 @75Hz (VESA)
                                   1280 x 1024 @75Hz (VESA)
      Manufacturer's timings:  1152 x 870 @75Hz (Apple,Mac II)
Standard Timing Identification #1
        Horizontal active pixels : 640
        Aspect Ratio             : 4:3
        Refresh Rate             : 85
Standard Timing Identification #2
        Horizontal active pixels : 800
        Aspect Ratio             : 4:3
        Refresh Rate             : 85
Standard Timing Identification #3
        Horizontal active pixels   : 1024
        Aspect Ratio             : 4:3
        Refresh Rate             : 85
Standard Timing Identification #4
        Horizontal active pixels   : 1280
        Aspect Ratio             : 5:4
        Refresh Rate             : 85
Standard Timing Identification #5
        Horizontal active pixels : 1600
        Aspect Ratio             : 4:3
        Refresh Rate             : 75

Standard Timing Identification #6
        Horizontal active pixels : 1920
        Aspect Ratio             : 4:3
        Refresh Rate             : 60

Detailed Timing #1
        Pixel Clock (MHz)        : 202.5
        H Active (pixels)        : 1600
        H Blanking (pixels)      : 560
        V Active (lines)         : 1200
        V Blanking (lines)       : 50
        H Sync Offset (F Porch) (pixels): 64
        H Sync Pulse Width (pixels): 192
        V Sync Offset (F Porch) (lines) : 1
        V Sync Pulse Width (lines): 3
        H Image Size (mm)        : 360
        V Image Size (mm)        : 270
        H Border (pixels)        : 0
        V Border (lines)         : 0
        Flags                    : Non-interlaced
                                 : Normal Display, No stereo
                                 : Digital Separate sync.
                                 : Positive Vertical Sync.
                                 : Positive Horizontal Sync.

Monitor Descriptor #2
        Serial Number            :  TY  123456

Monitor Descriptor #3
        Monitor Name             : PHILIPS 109B5

Monitor Descriptor #4
        Monitor Range Limits
        Min. Vt rate Hz          : 50
        Max. Vt rate Hz          : 160
        Min. Horiz. rate kHz     : 30
        Max. Horiz. rate kHz     : 97
        Max. Supported Pixel     : 240

        No secondary GTF timing formula supported.

Extension Flag                   : 0

Check sum                        : 7F (HEX.)
```

```
**********************************************************************
                        EDID data (128 bytes)
**********************************************************************

 0: 00  1: ff  2: ff  3: ff  4: ff  5: ff  6: ff  7: 00
 8: 41  9: 0c 10: 18 11: e0 12: 39 13: 30 14: 00 15: 00
16: 21 17: 0d 18: 01 19: 03 20: 68 21: 24 22: 1b 23: b5
24: ee 25: 9e 26: a8 27: a1 28: 54 29: 46 30: 99 31: 24
32: 0e 33: 48 34: 4c 35: ff 36: ff 37: 80 38: 31 39: 59
40: 45 41: 59 42: 61 43: 59 44: 81 45: 99 46: a9 47: 4f
48: d1 49: 40 50: 01 51: 01 52: 01 53: 01 54: 1a 55: 4f
56: 40 57: 30 58: 62 59: b0 60: 32 61: 40 62: 40 63: c0
64: 13 65: 00 66: 68 67: 0e 68: 11 69: 00 70: 00 71: 1e
72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59
80: 20 81: 20 82: 31 83: 32 84: 33 85: 34 86: 35 87: 36
88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50
96: 48 97: 49 98: 4c 99: 49 100: 50 101: 53 102: 20 103: 31
104: 30 105: 39 106: 42 107: 35 108: 00 109: 00 110: 00 111: fd
112: 00 113: 32 114: a0 115: 1e 116: 61 117: 18 118: 00 119: 0a
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 7f
```

Safety test requirements

All units that are returned for service or repair must pass the original manufactures safety tests. Safety testing requires both **Hipot** and **Ground Continuity** testing.

HI-POT TEST INSTRUCTION

1. Application requirements

1.1 All mains operated products must pass the Hi-Pot test as described in this instruction.

1.2 This test must be performed again after the covers have been refitted following the repair, inspection or modification of the product.

2. Test method

2.1 Connecting conditions

2.1.1 The test specified must be applied between the parallel-blade plug of the mainscord and all accessible metal parts of the product.

2.1.2 Before carrying out the test, reliable conductive connections must be ensured and thereafter be maintained throughout the test period.

2.1.3 The mains switch(es) must be in the "ON" position.

2.2 Test Requirements

All products should be HiPot and Ground Continuity tested as follows:

Condition	HiPot Test for products where the mains input range is Full range(or 220V AC)	HiPot Test for products where the mains input is 110V AC(USA type)	Ground Continuity Test requirement
Test voltage	2820VDC (2000VAC)	1700VDC (1200VAC)	Test current: 25A,AC Test time: 3 seconds(min.) Resistance required: <=0.09+R ohm, R is the resistance of the mains cord.
Test time (min.)	3 seconds	1 second	
Trip current (Tester)	set at 100 uA for Max. limitation; set at 0.1 uA for Min. limitation	5 mA	
Ramp time	set at 2 seconds		

2.2.1 The test with AC voltage is only for production purpose, Service center shall use DC voltage.

2.2.2 The minimum test duration for Quality Control Inspector must be 1 minute.No breakdown during the test.

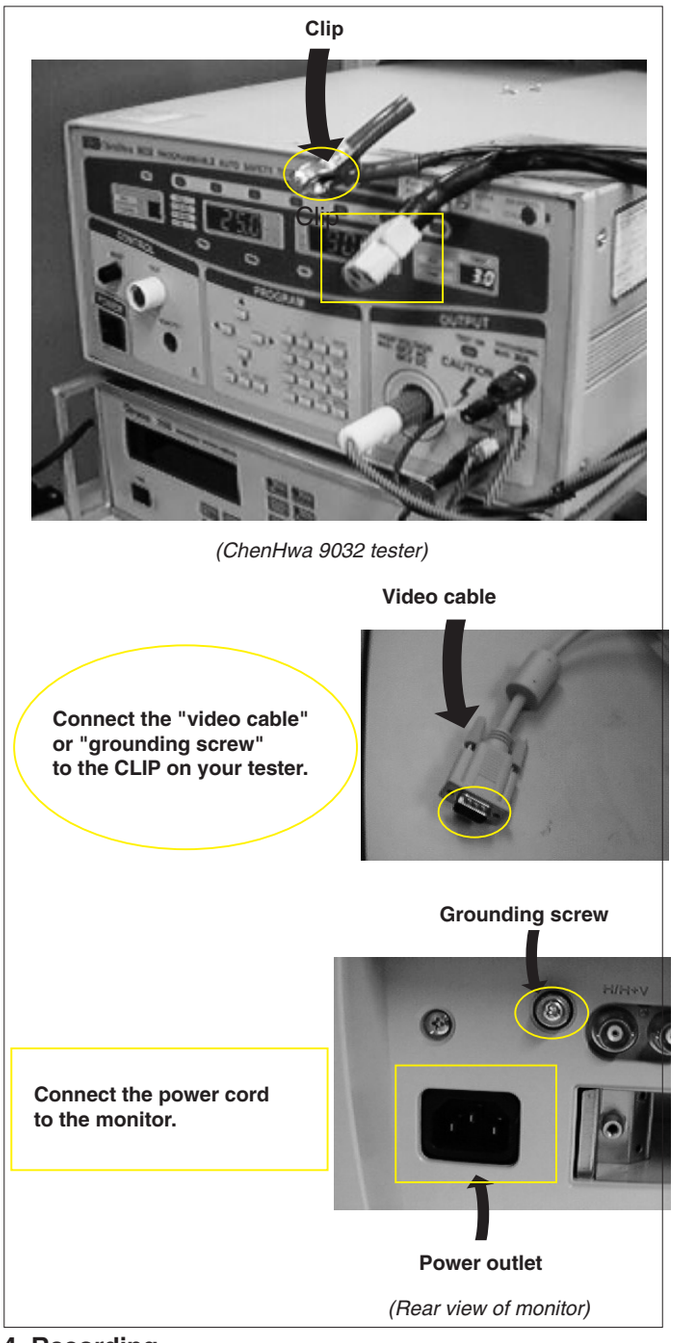
2.2.3 The test voltage must be maintained within the specified voltage + 5%.

2.2.4 The grounding blade or pin of mains plug must be conducted with accessible metal parts.

3. Equipments and Connection

3.1. Equipments
For example :
- ChenHwa 9032 PROGRAMMABLE AUTO SAFETY TESTER
- ChenHwa 510B Digital Grounding Continuity Tester
- ChenHwa 901 (AC Hi-pot test), 902 (AC, DC Hi-pot test) Withstanding Tester

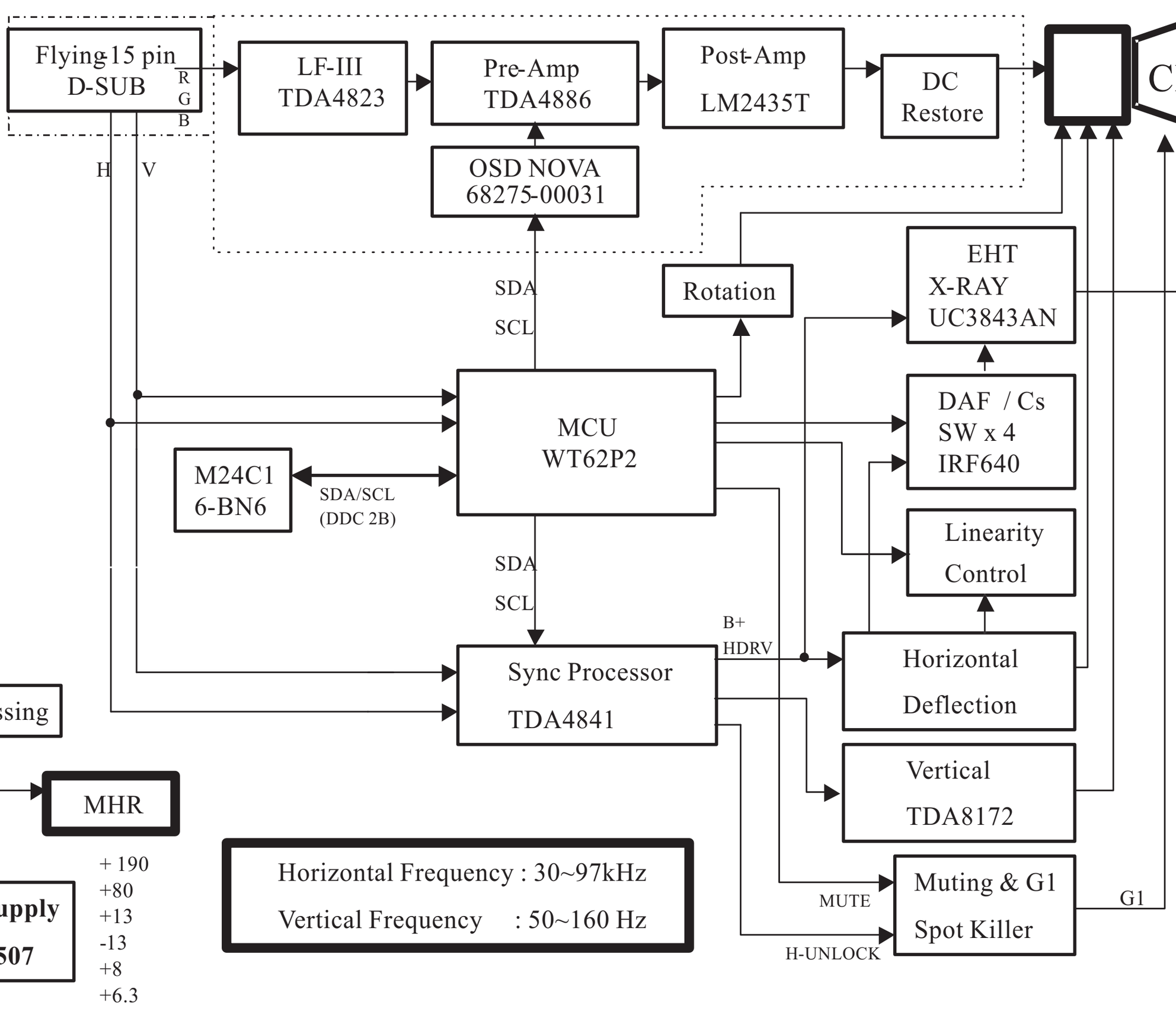
3.2. Connection
* Turn on the power switch of monitor before Hipot and Ground Continuity testing.



4. Recording

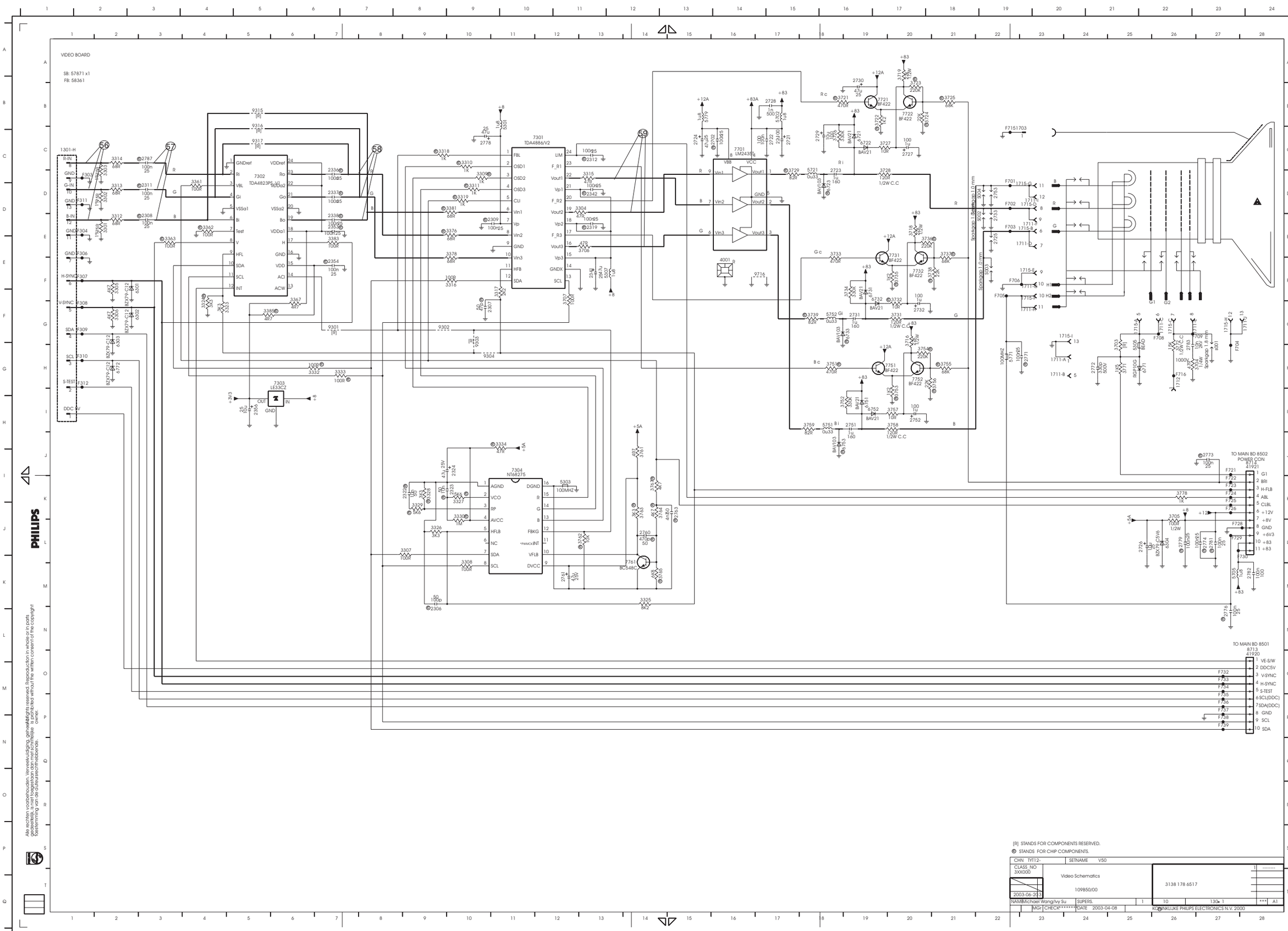
Hipot and Ground Continuity testing records have to be kept for a period of 10 years.

Block Diagram of V50 109B5



Go to cover page

Video Panel Schematic diagram



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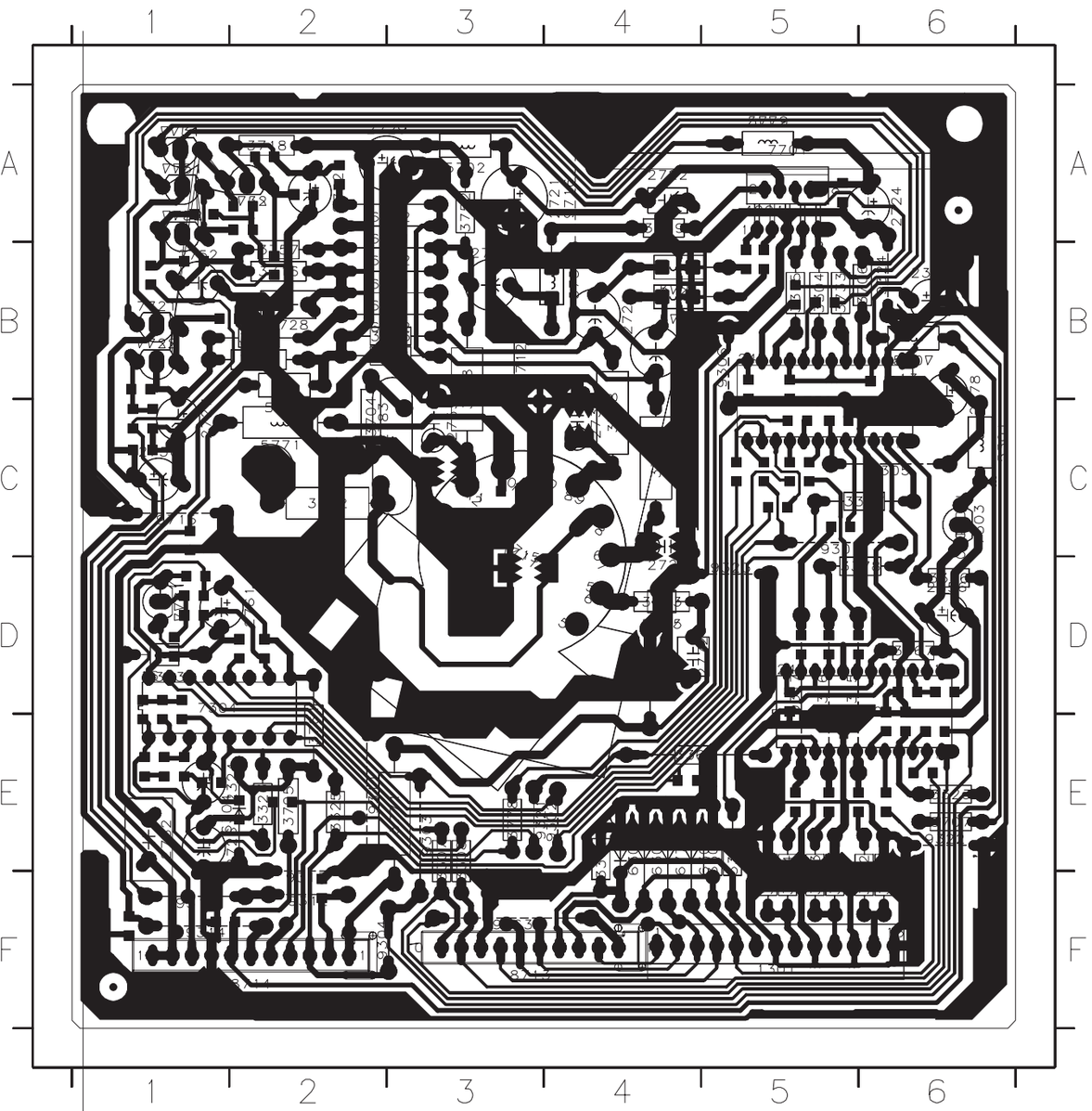
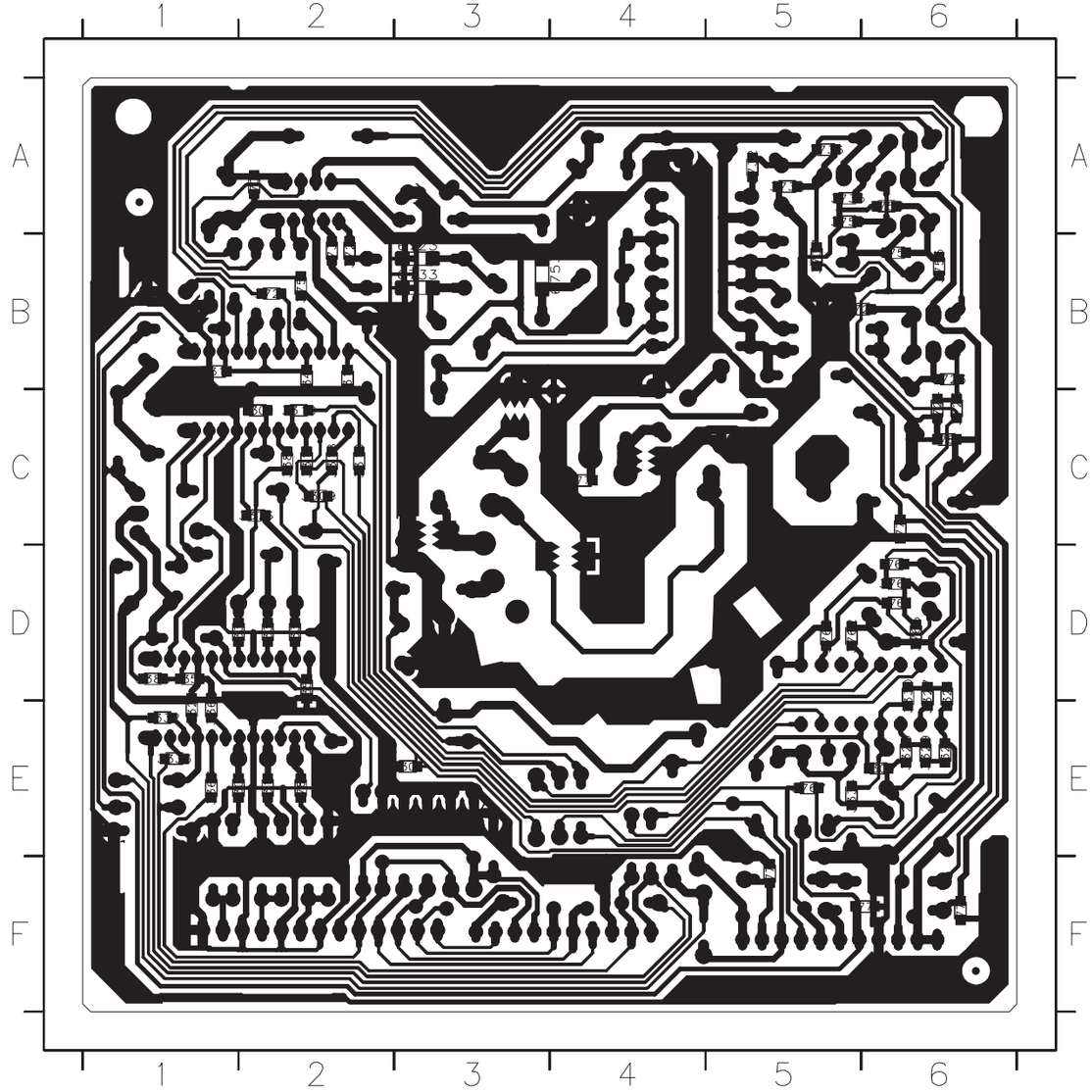
C.B.A. Of Video Board



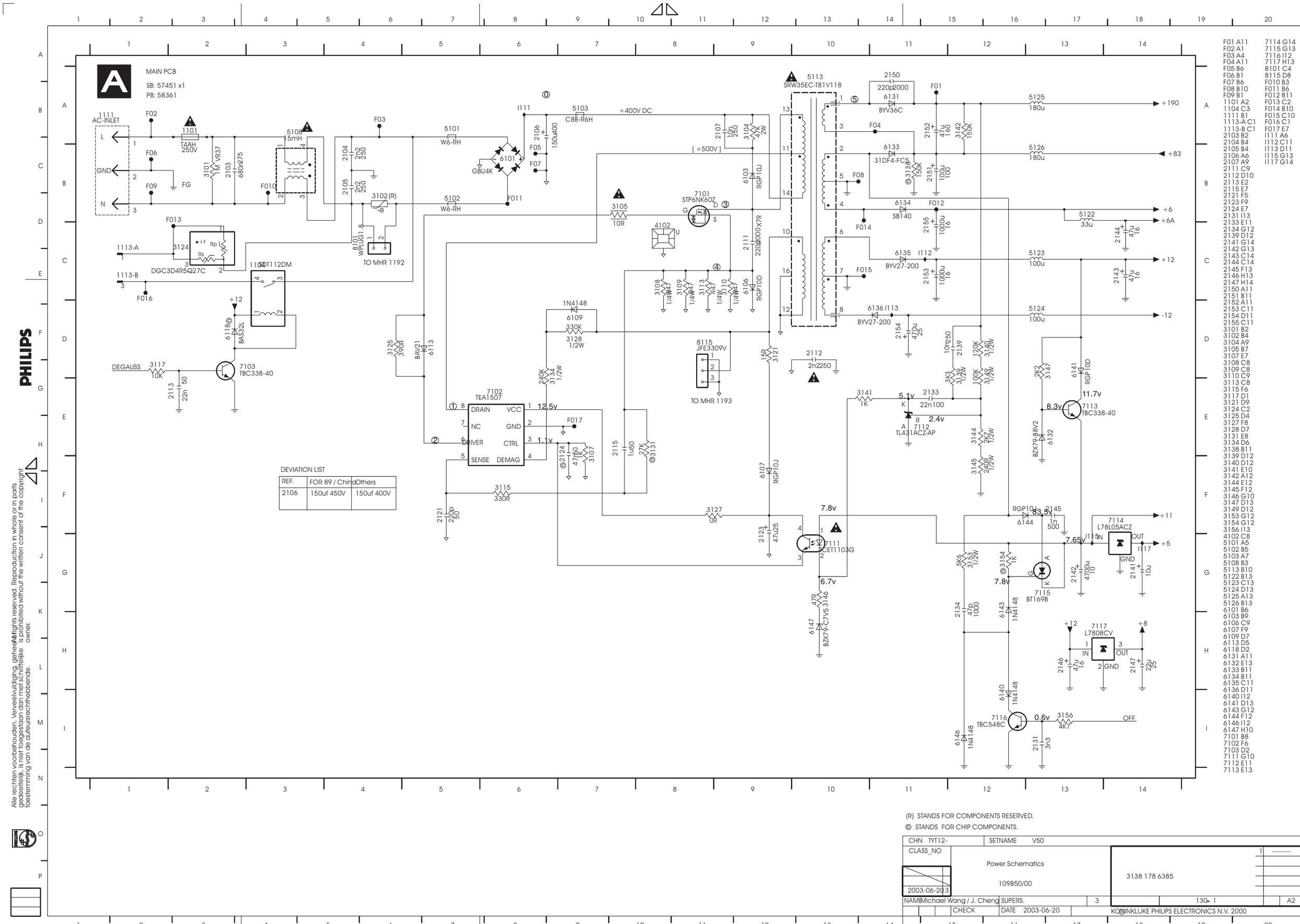


1301	F5	5303	D1	2306	E6	3349	F6
1703	D2	5305	D4	2307	E3	3350	D6
1711	C3	5307	B6	2308	E1	3352	E1
1712	C2	5702	A3	2309	C2	3353	E1
1715	C3	5705	C2	2311	E2	3354	E5
2324	E2	5721	B4	2312	B2	3362	E1
2341	B6	5751	B4	2316	B1	3363	E1
2356	D6	5752	B4	2322	E6	3376	C2
2721	A4	5771	C2	2323	D6	3381	C2
2722	A4	5779	A5	2326	D2	3385	D1
2723	B4	6301	E4	2337	D2	3721	B2
2724	A6	6302	E4	2338	D1	3722	B5
2725	D4	6303	E5	2342	B2	3723	B6
2726	E2	6304	F1	2353	D2	3724	C6
2727	C1	6721	B3	2354	D1	3725	C6
2728	B2	6722	B3	2702	A2	3729	B2
2729	A2	6731	A3	2760	D6	3732	A5
2730	C1	6732	A3	2763	D6	3735	A5
2731	B4	6751	B3	2771	C4	3736	A5
2732	A2	6752	B3	2773	F5	3737	B5
2733	C4	6771	D4	2774	F6	3738	A5
2751	B3	6772	E4	2776	C6	3739	B2
2752	B1	7301	C5	2779	F6	3751	B2
2753	C3	7302	D6	2781	C6	3753	A5
2761	D2	7303	C6	2787	E2	3754	B6
2772	D5	7304	D1	3309	C2	3755	B6
2778	B6	7701	A5	3310	C2	3756	A6
2782	E1	7721	B1	3311	C2	3762	D5
2783	C2	7722	B1	3318	C2	3763	D5
3301	F6	7731	A1	3319	C2	3764	D6
3302	F5	7732	A2	3324	E1	3765	D6
3303	F5	7751	A1	3327	D6	3767	E5
3304	B5	7752	A1	3328	E6	6723	B3
3305	E4	7761	D1			6733	B3
3306	E5	8713	F3			6753	B4
3307	E3	8714	F2				
3308	E3	9301	C5				
3312	F6	9302	E4				
3313	F5	9303	E3				
3314	F5	9304	F3				
3315	B5	9305	C6				
3316	D6	9306	B5				
3317	C6	9311	F2				
3323	E6	9312	F2				
3325	E2	9313	F2				
3326	E2	9314	F1				
3361	E4	9315	D5				
3367	D6	9316	D5				
3378	D6	9317	D5				
3383	E5	9319	F1				
3703	D4	9321	E3				
3704	C2	9322	E6				
3705	E2	9323	D5				
3706	B6	9324	B6				
3707	E6	9363	F3				
3716	B2	9712	B3				
3718	A2	9715	C1				
3719	B2	9716	A4				
3726	B3						
3727	B2						
3728	C4						
3731	C4						
3733	B5						
3734	B3						
3752	A3						
3757	B2						
3758	B3						
3759	A4						
3761	E2						
3771	E3						
3772	C2						
3778	E3						
4001	A5						
5301	C6						

CN: TYT12-	V50 109B				
CLASS NO. 3XX000	Video Board V50 109B CRT MTR	3138 103 5787	1	2003-06-20	
1 2 2003-06-20 3					
NAME Michael Wang/Ivy Su	SUPERS	2	10	132 - 1	A3
CHECK	DATE 2003-06-20	© Philips Electronics N.V.			

PowerSchematic diagram

Go to cover page



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CHN TYT12-	SETNAME V50		
CLASS_NO	Power Schematics	3138 178 6385	1 --------
2003-06-203	109B50/00		
NAME Michael Wang / J. Cheng	SUPERS.	3	130- 1 A2
	CHECK	DATE 2003-06-20	KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000

Schematic diagram of Main Board

MAIN PCB

SB: 57451 x1
PB: 58361

TO VIDEO BD 8714

TO VIDEO BD 8713

TO CRT ASSY

TO CTR'L BD 8899

DEVIATION LIST

REF.	LG TUBE	SDI TUBE	CPT TUBE
2631	100P 2KV	NONE	NONE
2632	150P 2KV	220P 2KV	220P 2KV
3407	1R8 1/2W	2R 1/2W	2R 1/2W
3503	12K 1/2W	18K 1/2W	8K2 1/2W
3505	47K 1/6W	68K 1/6W	47K 1/6W
3508	270K VR25	270K VR25	330K VR25
3558	180K VR25	180K VR25	150K VR25

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CHN TYT12-		SETNAME V50	
CLASS_NO		Defl. Schematics	3138 178 6385
2003-06-20	3	109850/00	
NAM Michael Wang / J. Cheng SUPERS.		3	138 2 A1
CHECK	DATE 2003-06-20	KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000	

EHT Schematic Diagram

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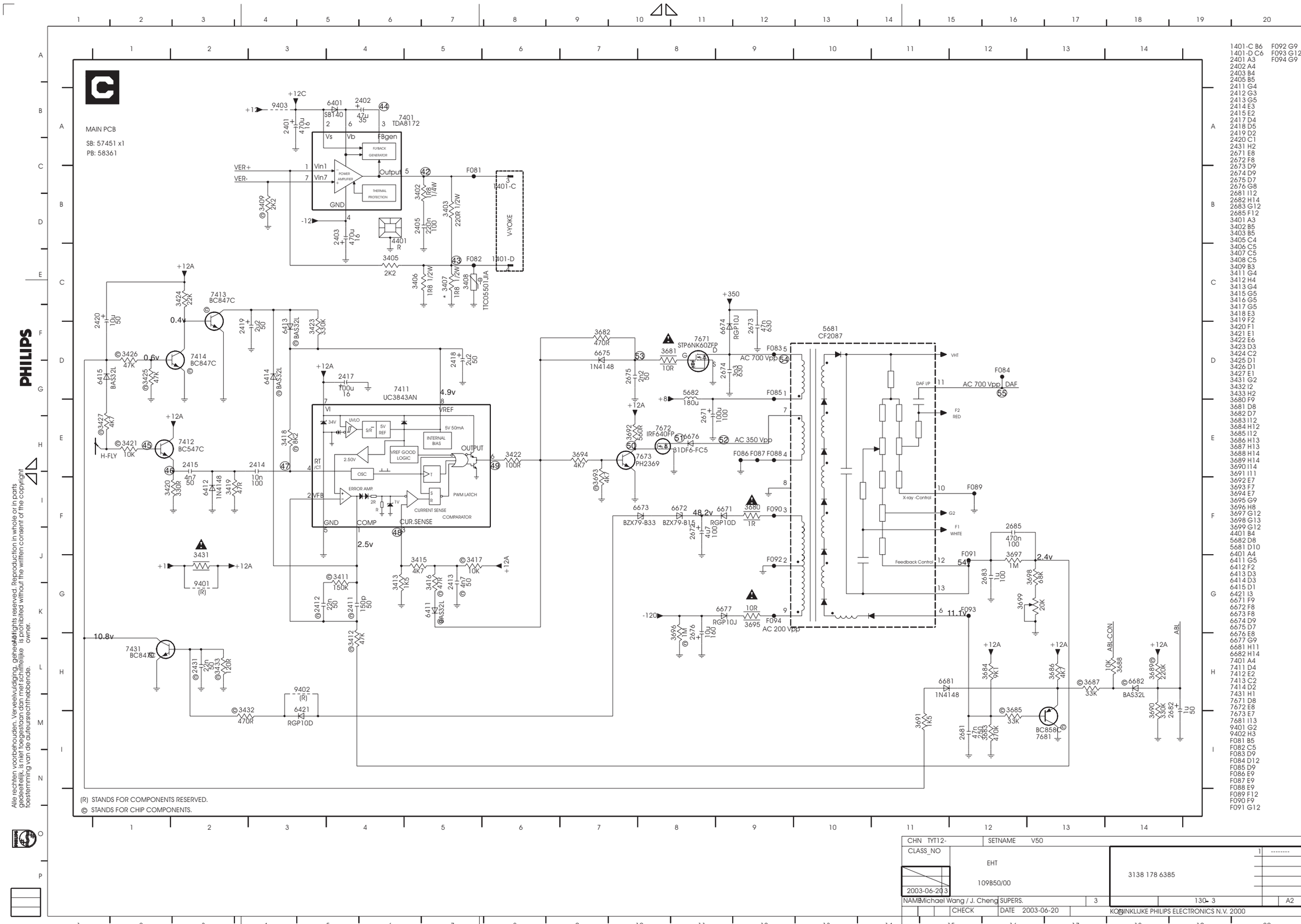

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CHN TYT12-	SETNAME V50		
CLASS_NO	EHT	1	--------
2003-06-20	109850/00	3138 178 6385	
NAME Michael Wang / J. Cheng	SUPERS.	3	130 - 3 A2
	CHECK	DATE 2003-06-20	KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000

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1401-D C6 F093 G12
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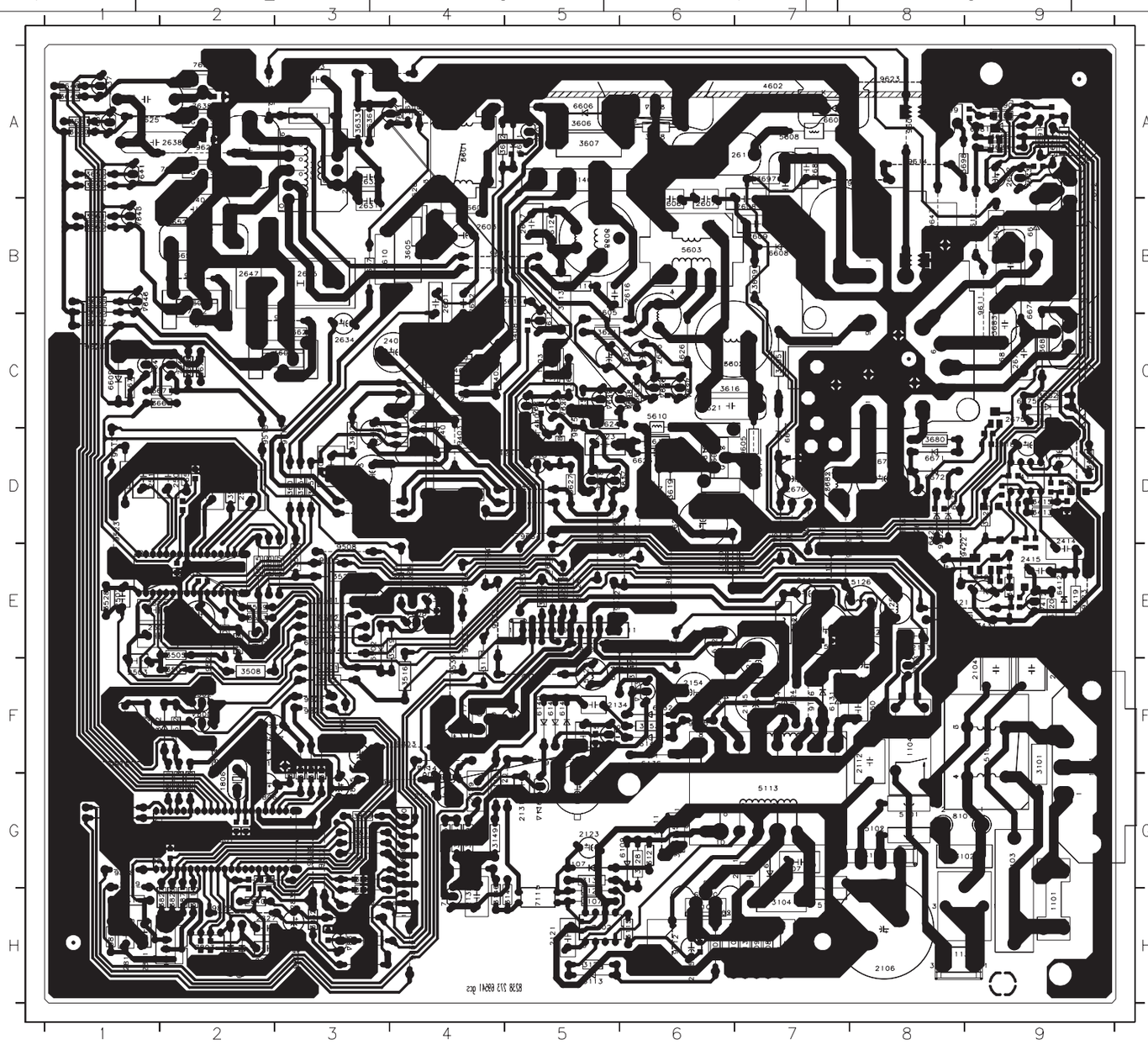

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CN: TYT12-	V50 109B	
CLASS NO. 3XX000	Pwr+Defl Board V50 109B CRT MTR	3138 103 5745
2003-06-20		1 2003-06-20
NAME Michael Wang	SUPERS	2 10 132 - 1 A3
CHECK	DATE 2003-06-20	© Philips Electronics N.V.

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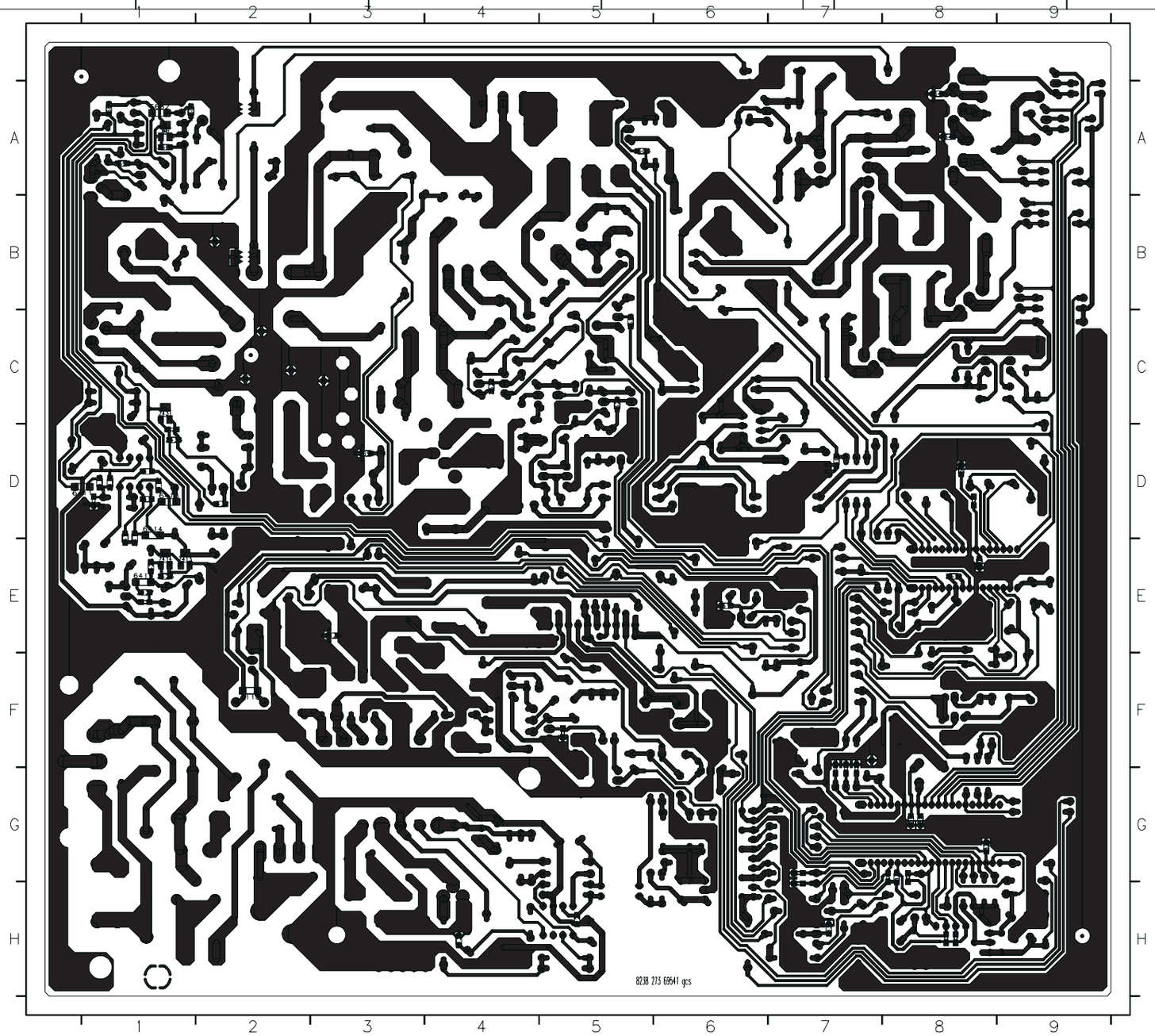

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1 / 2 / 2003-06-20 / 3						
NAME Michael Wang	SUPERS	2	10	132 - 2		A3
CHECK	DATE 2003-06-20	©	Philips Electronics N.V.			

Waveform of Main Board

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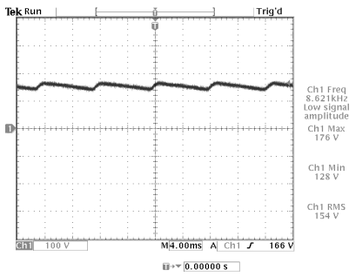

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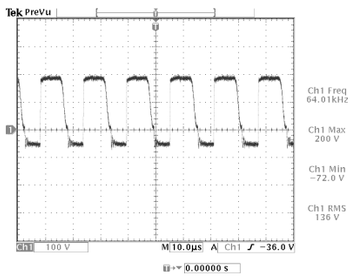

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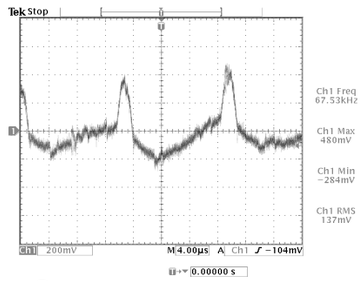

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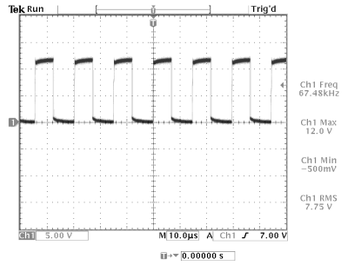

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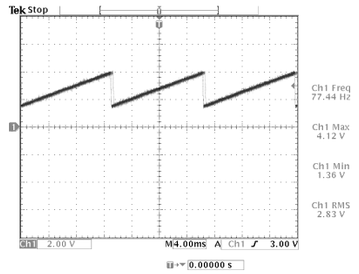

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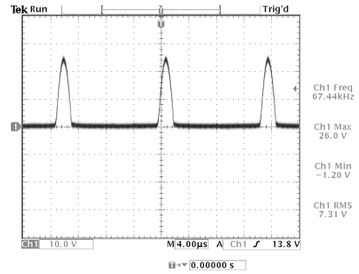

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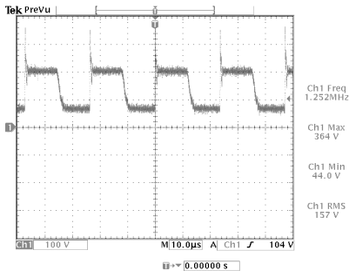

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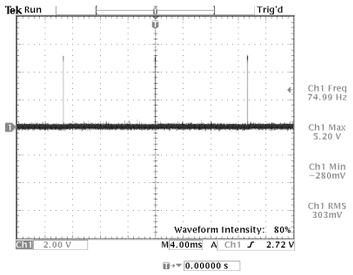

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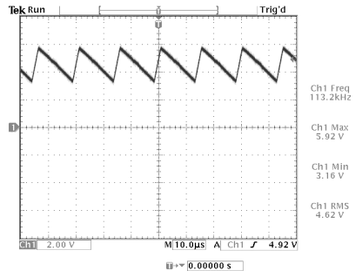

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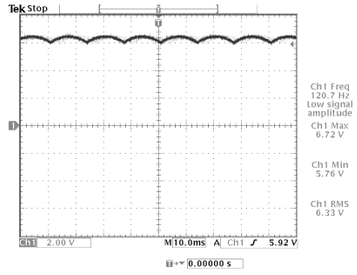

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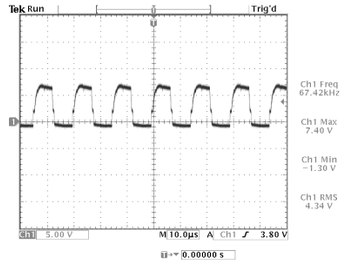

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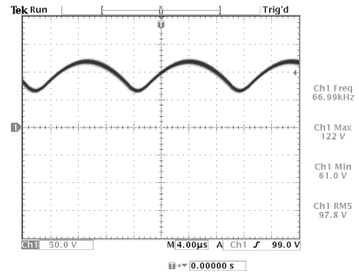

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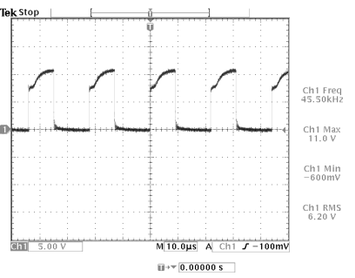

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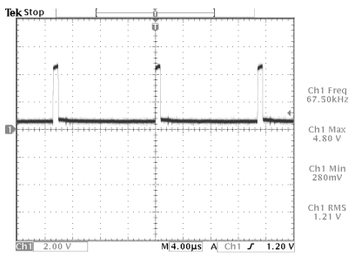

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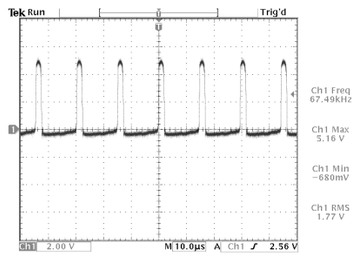

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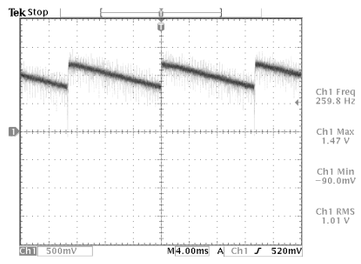

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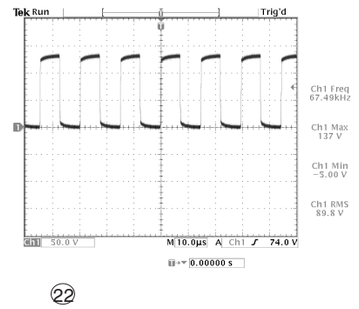

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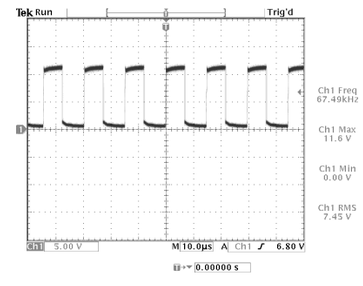

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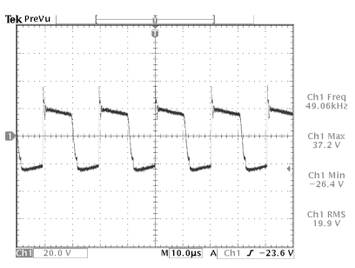

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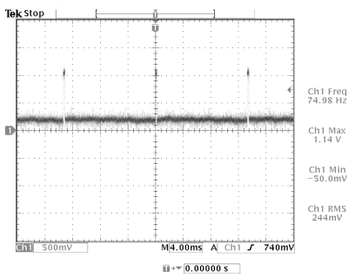

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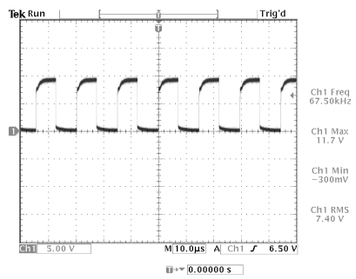

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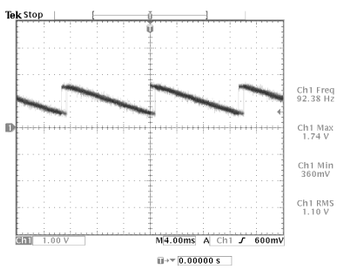

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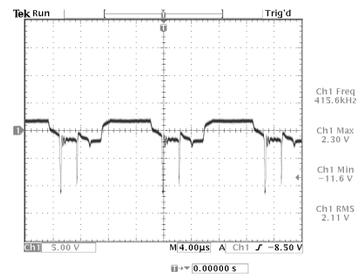

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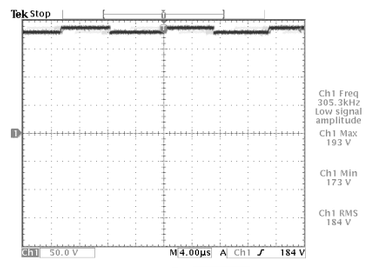

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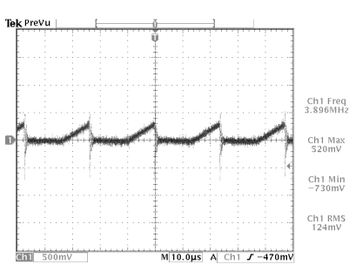

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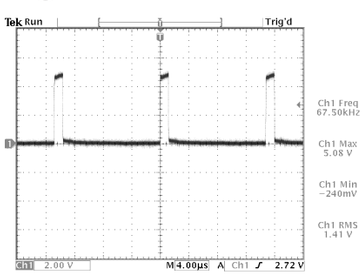

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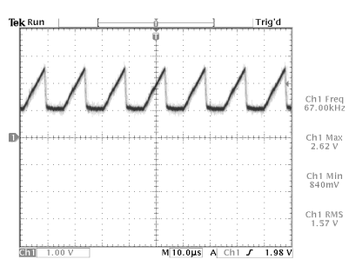

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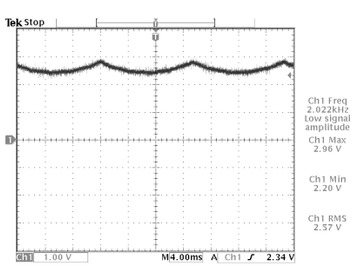

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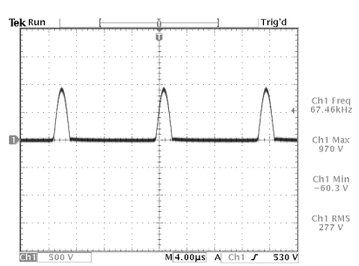

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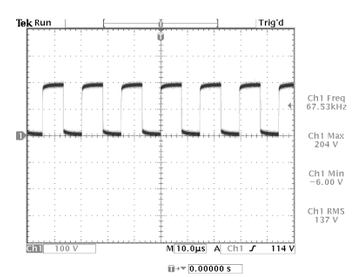

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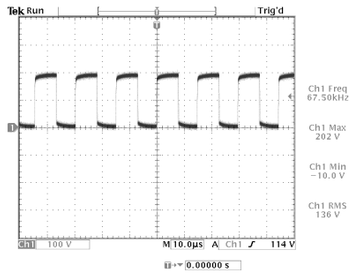
Waveform of Main & Video Panel



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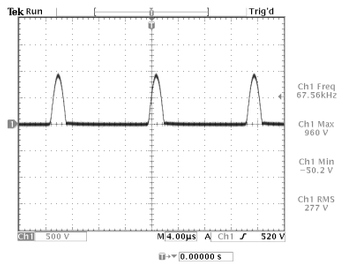

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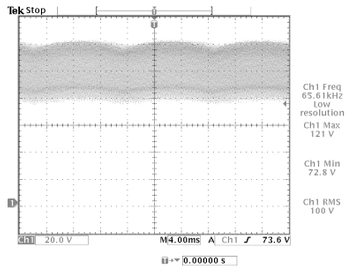

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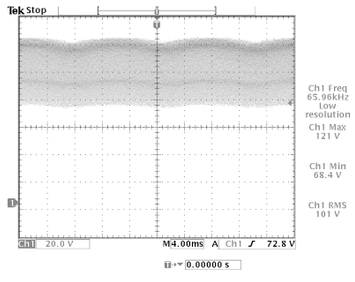

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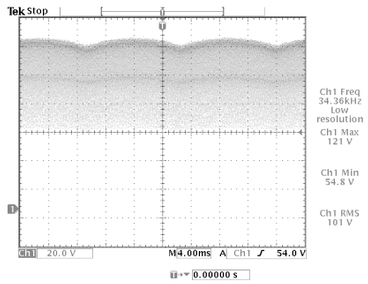

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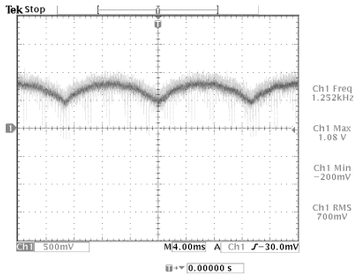

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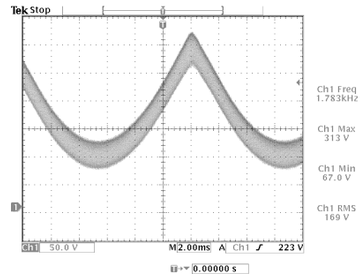

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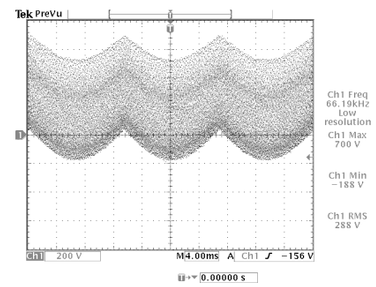

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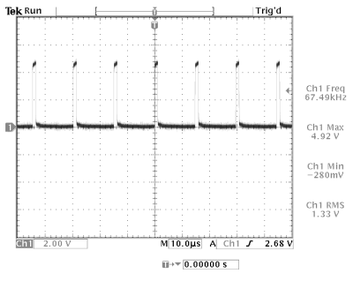

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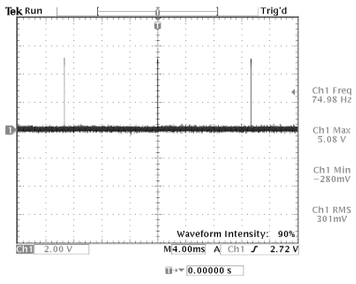

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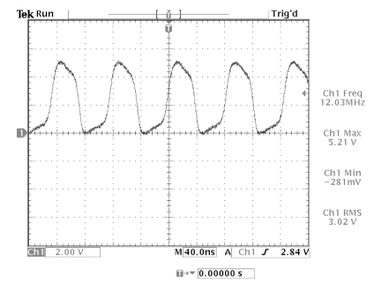

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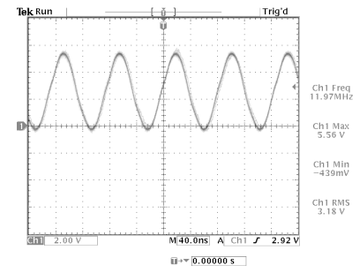

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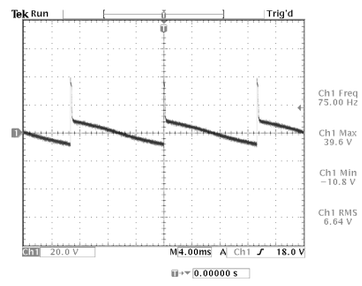

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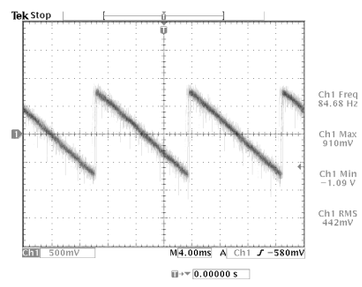

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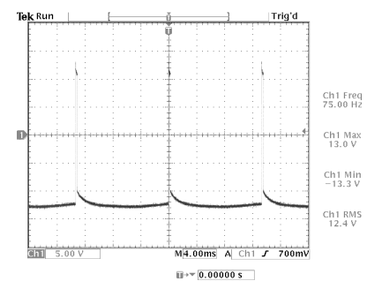

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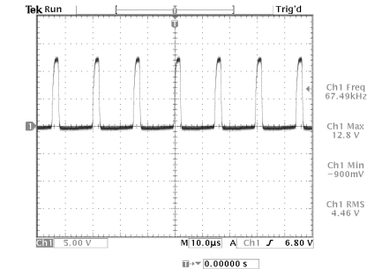

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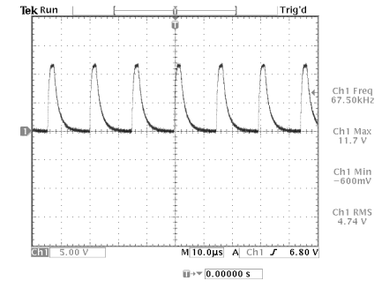

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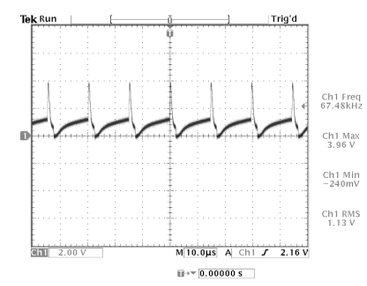

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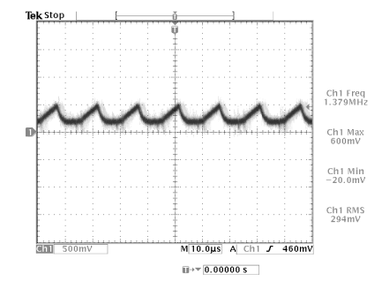

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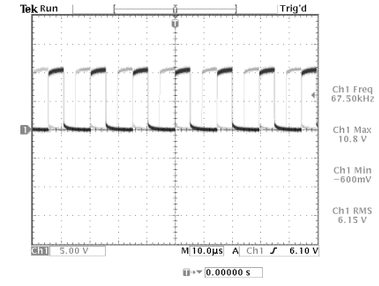

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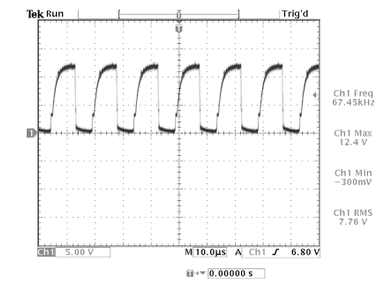

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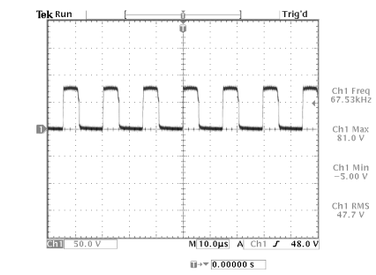

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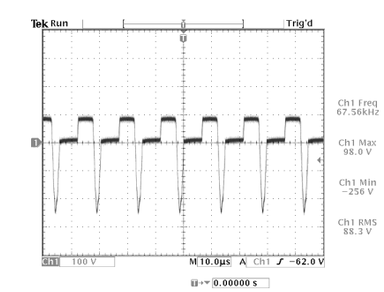

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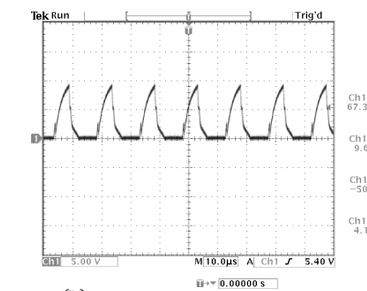

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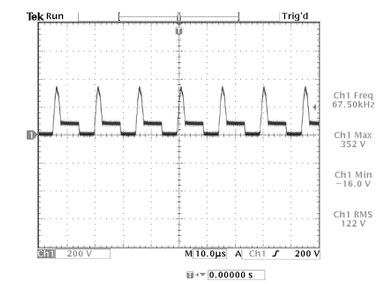

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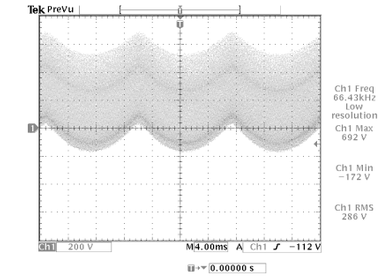

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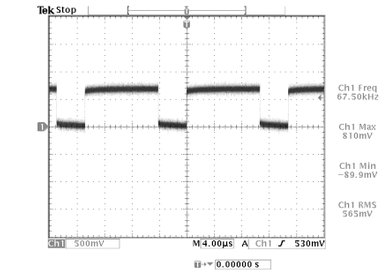

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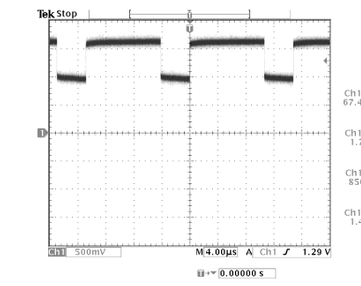

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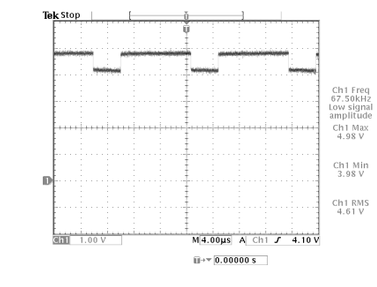

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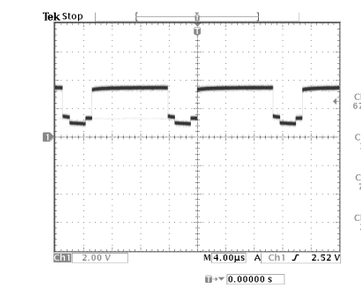

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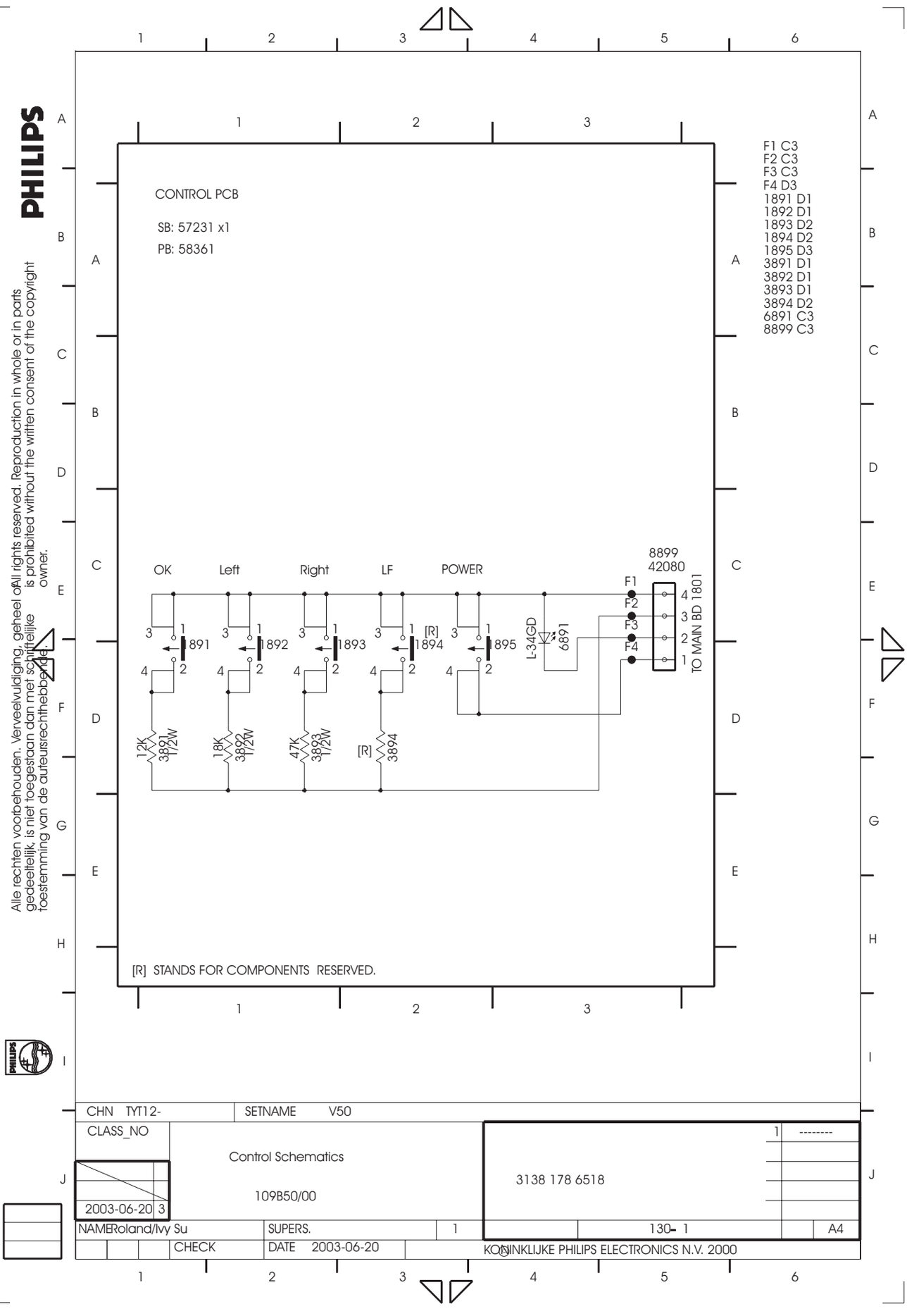
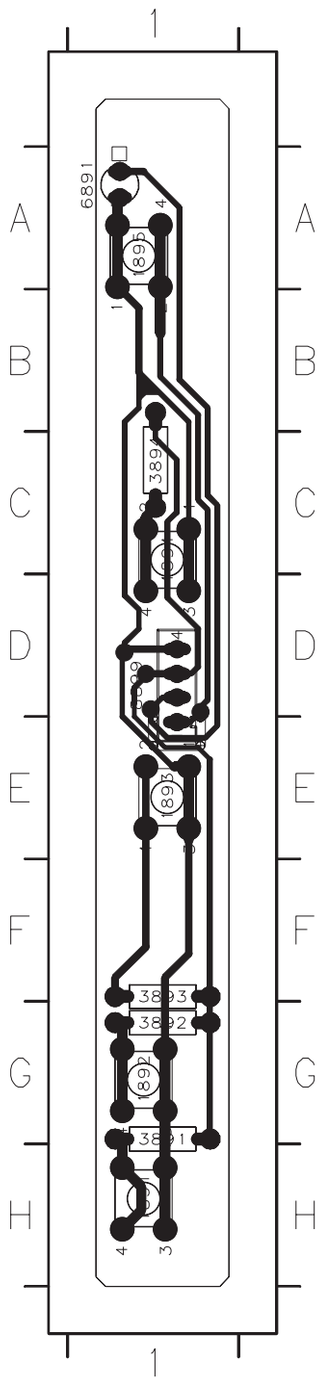
Control Panel Scahematic



Control Panel board C.B.A.



1891 H1
1892 G1
1893 E1
1894 C1
1895 A1
3891 G1
3892 G1
3893 F1
3894 C1
6891 A1
8899 D1

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CN: TYT12- | V20 107E5

CLASS NO. 3XX000

Control Board
V20 CRT MTR

3138 103 5723

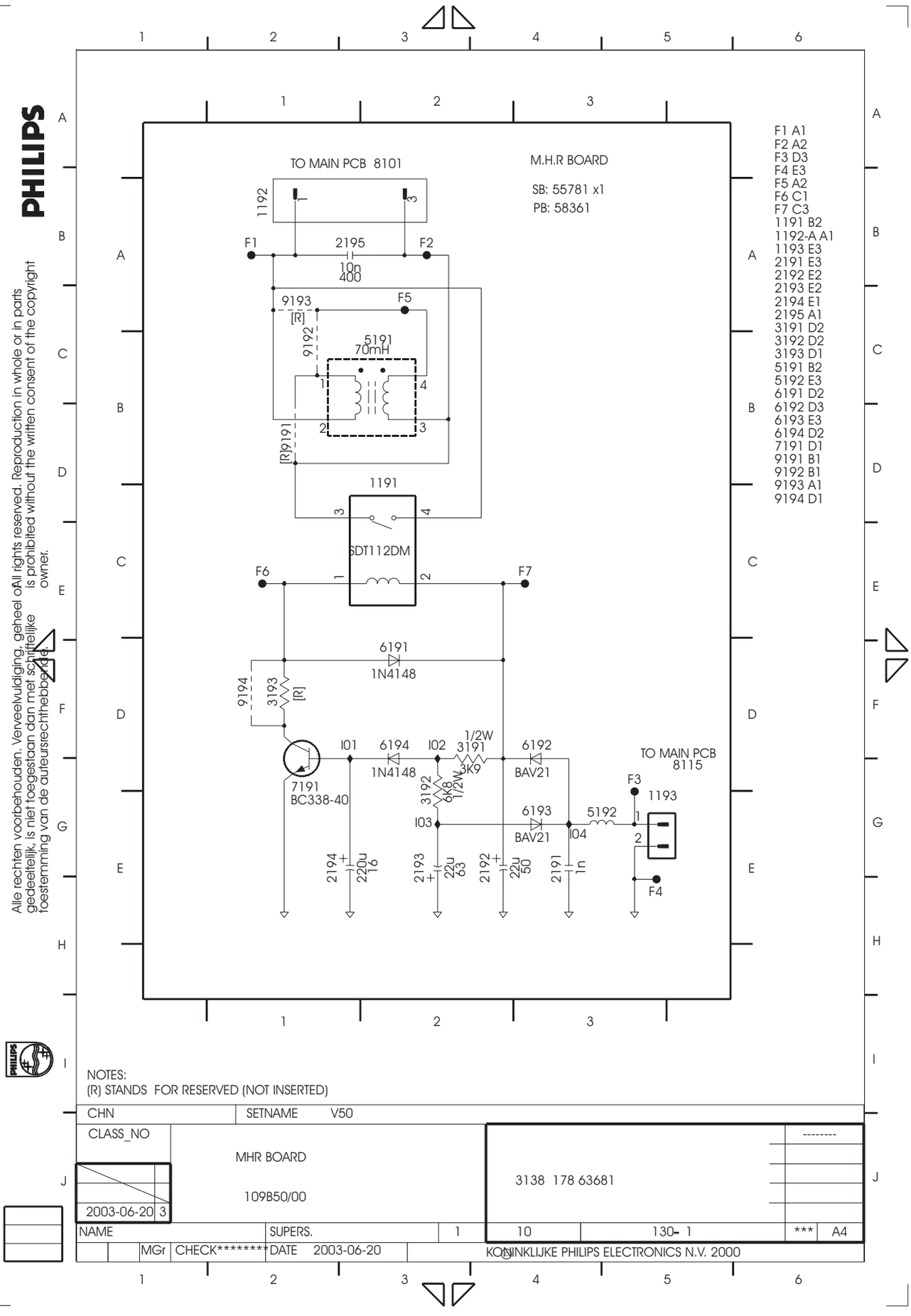
1 2002-12-18

2002-12-18 3

NAME Roland/Ivy Su | SUPERS | 1 | 10 | 132 - 1 | A4

CHECK | DATE 2002-12-18 | © Philips Electronics N.V.

MHR Panel Scahematic



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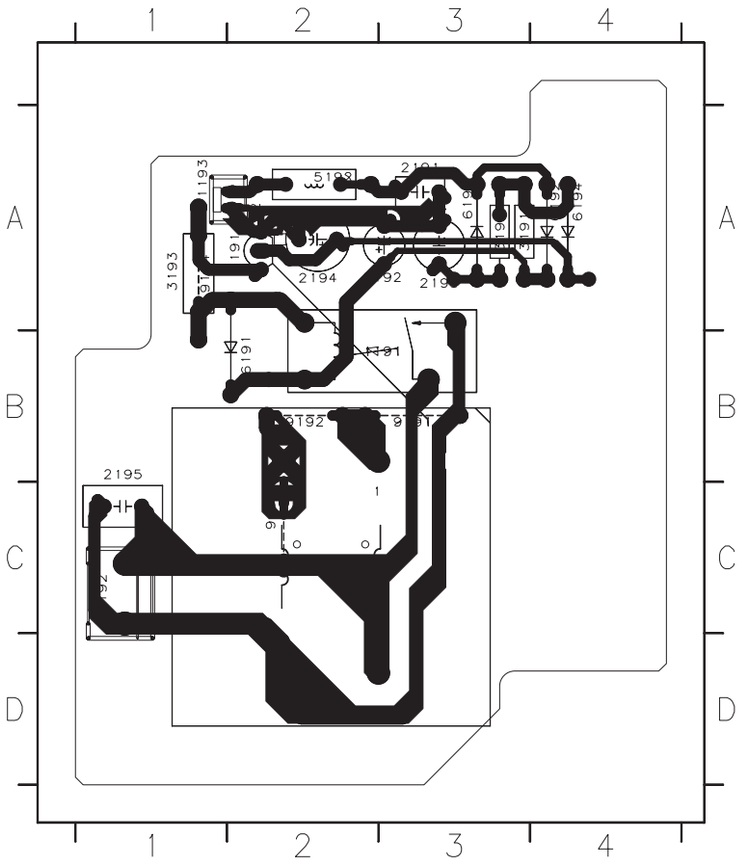
NOTES:
(R) STANDS FOR RESERVED (NOT INSERTED)

CHN	SETNAME V50						
CLASS_NO	MHR BOARD			3138 178 63681			--------
2003-06-20 3	109B50/00						
NAME	SUPERS.		1	10	130- 1	***	A4
MGr	CHECK********	DATE 2003-06-20		KONINKLIJKE PHILIPS ELECTRONICS N.V. 2000			

MHR board C.B.A.



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1192	C1
1193	A1
2191	A3
2192	A3
2193	A3
2194	A2
2195	B1
3191	A3
3192	A3
3193	A1
5191	C2
5192	A2
6191	B2
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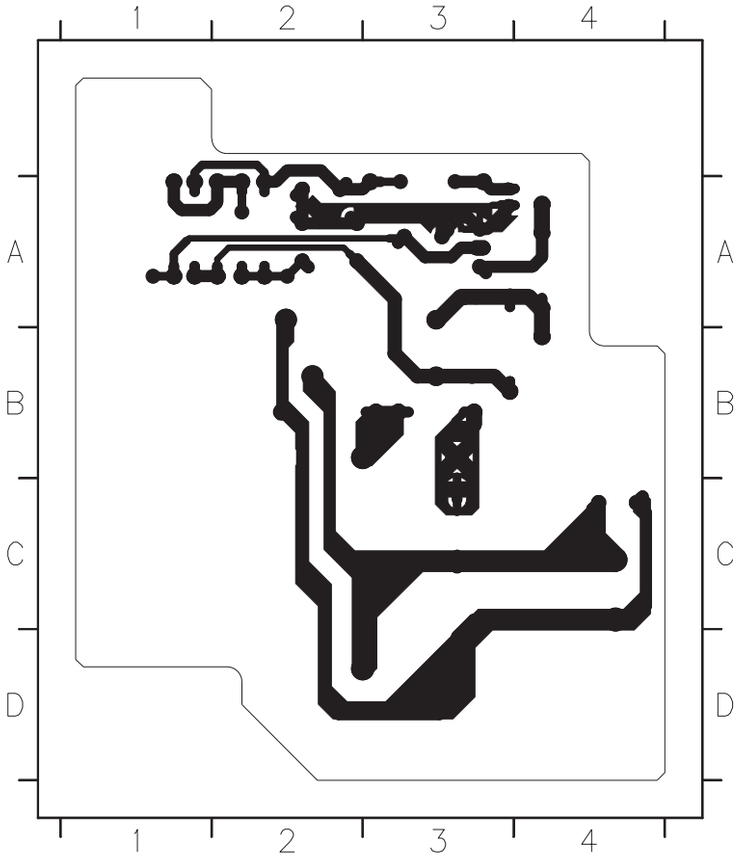
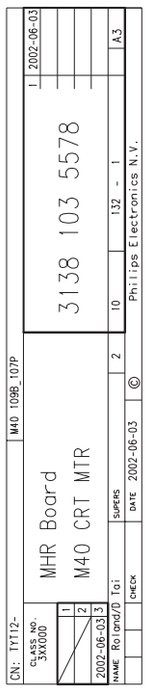
9191	B3
9192	B2
9193	C2
9194	A1





Repair Tips

0. Warning

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and tools also at the same potential !

1. Servicing of SMDs (Surface Mounted Devices)

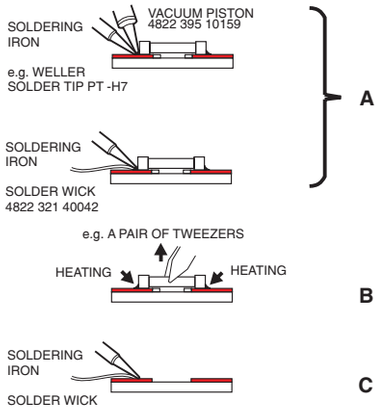
1.1 General cautions on handling and storage

- Oxidation on the terminals of SMDs results in poor soldering. Do not handle SMDs with bare hands.
- Avoid using storage places that are sensitive to oxidation such as places with sulphur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity. The capacitance or resistance value of the SMDs may be affected by this.
- Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

1.2 Removal of SMDs

- Heat the solder (for 2-3 seconds) at each terminal of the chip. By means of litz wire and a slight horizontal force, small components can be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1A)

Fig. 1 DISMOUNTING



- While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

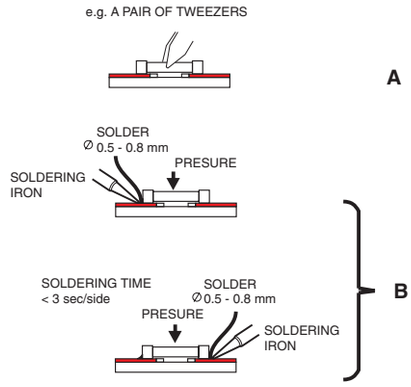
1.3 Caution on removal

- When handling the soldering.iron. use suitable pressure and be careful.
- When removing the chip, do not use undue force with the pair of tweezers.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).
- The chip, once removed, must never be reused.

1.4 Attachment of SMDs

- Locate the SMD on the solder lands by means of tweezers and solder the component on one side. Ensure that the component is positioned correctly on the solder lands (see Fig.2A).
- Next complete the soldering of the terminals of the component (see Fiq. 2B).

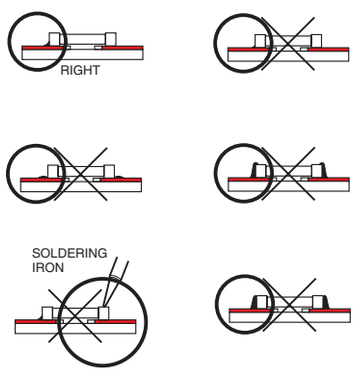
Fig. 2 MOUNTING



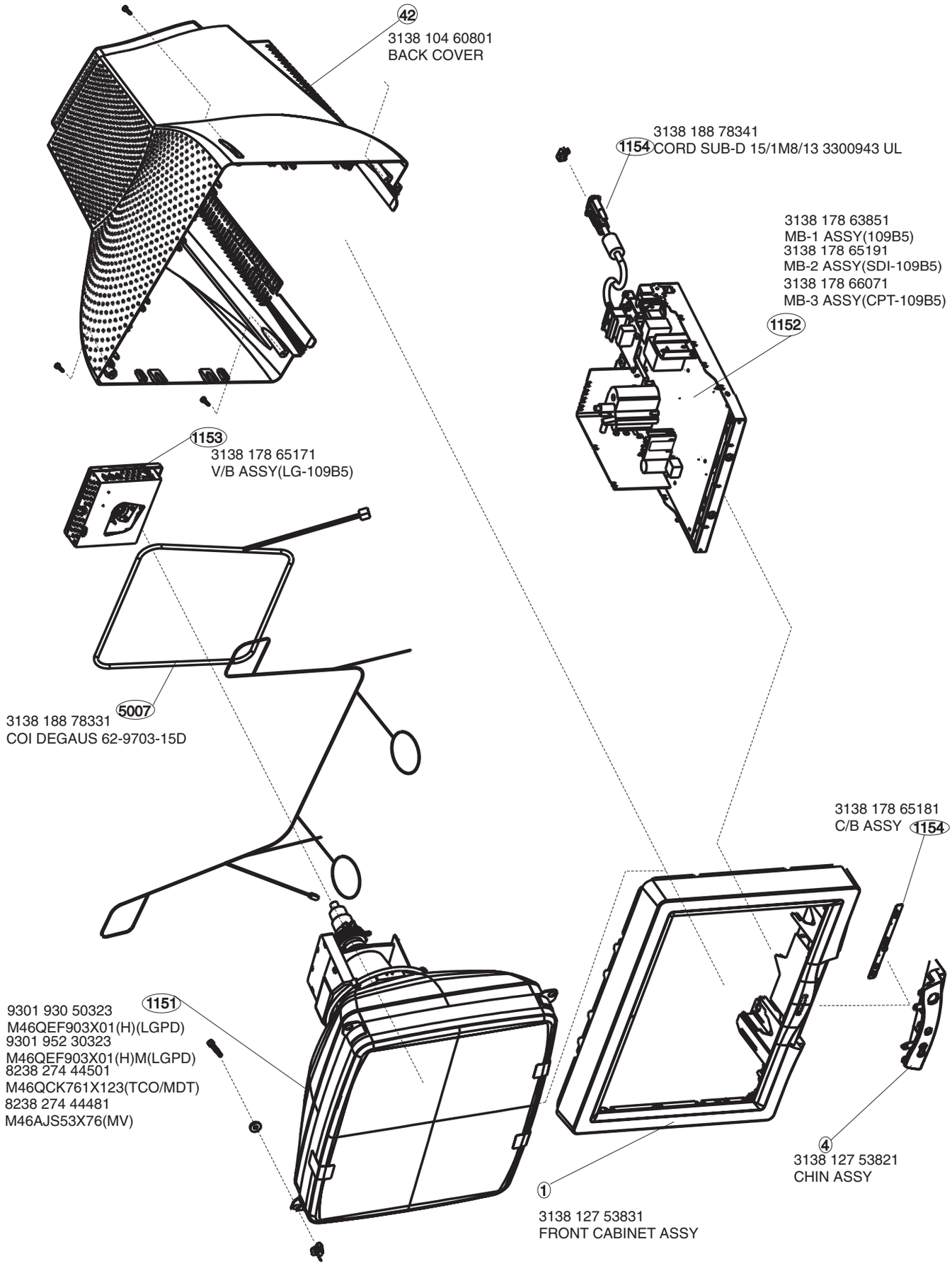
2. Caution when attaching SMDs

- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering should be done as quickly as possible, care must be taken to avoid damage to the terminals of the SMDs themselves.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 °C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used, but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- The quantity of solder must be proportional to the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

Fig. 3 Examples



Exploded View



Recmmended parts list

Recommended parts list of V50 109B50/00(863900014291)

0001	313812753831	FRONT CABINET ASSY
0003	313812753811	PEDESTAL ASSY
0004	313812753821	CHIN ASSY
0042	313810460801	BACK COVER
0057	313810440571	HOUSING COVER
0212	313811577881	LABEL-CPU
0213	313811577891	LABEL-EEPROM(LPL)
0450	313810662131	CARTON
0451	313810662141	CUSHION-TOP
0452	313810662151	CUSHION-BOTTOM
0454	313810656651	PE BAG
0601	313811705601	E-D.F.U. ASSY
0615	313811705001	HEX CODE OF F/W (NO MATL)
1053	313816874231	MAINS CORD
1054	313818878341	CORD SUB-D 15/1M8/13 330943 UL
1101	242208600208	FUSE 5X20 HT 4A 250V IEC B
1104	242213207402	RELAY 1P 12V 10/80A SDT-SS L
1111	313817876762	AC INLET ASSY
1151	930193050323	CRT M46QEF903X01(H) (LGPD) B
1152	313817863851	MB-1 ASSY (109B5)
1153	313817865171	VB ASSY (LG-109B5)
1154	313817865181	C/B ASSY
1155	313817863681	MHR ASSY 109B5
1191	242213207401	RELAY 1P 12V 10A FTR-H2A B
5681	313818878571	TFM LOT LAYER 11MM WIRE
7102	935267356112	IC TEA1507P/N1 (PHSE) L
7111	932214014667	OPT CP TCET1103(G) (VISH) L
7112	932208697676	IC TL431ACZ-AP S (ST00) A
7114	932208234676	IC L78L05ACZ (ST00) A
7115	933826850126	THYRIS BT169B (PHSE) A
7117	933920810682	IC L7808CV (ST00) L
7191	933953420676	TRA SIG TBC338-40 (TOSJ) A
7301	935266857112	IC TDA4886/V2 (PHSE) L
7302	935270542112	IC TDA4823PS/V1 (PHSE) L
7303	932210611676	IC LE33CZ (ST00) A
7304	932218565682	IC NT68275-00031 (NOVA) L
7411	932201959682	IC UC3843AN (MOTA) L
7501	935267455112	IC TDA4841PS/V3 (PHSE) L
7502	933450090126	TRA SIG PH2369 (PHSE) A
7601	934003960126	FET SIG BSN254A (PHSE) A
7611	932216831676	TRA SIG BC337-40 (KEC0) A
7616	932218832687	FET POW FQP6P25 (FSC0) L
7631	934025870126	TRA SIG MPSA44 (PHSE) A
7638	932217995687	FET POW IRF630B (FSC0) L
7640	932217996687	FET POW IRF640B (FSC0) L
7673	933450090126	TRA SIG PH2369 (PHSE) A
7801	823827444541	CPU,IC
7803	932212662682	IC M24C16-BN6 (ST00) L

Spare Parts List

Go to cover page

Model : V50 109B50/00 (8639 000 14291)

Mechanical

0001	313812753831	FRONT CABINET ASSY
0003	313812753811	PEDESTAL ASSY
0004	313812753821	CHIN ASSY
0042	313810460801	BACK COVER
0057	313810440571	HOUSING COVER

Various

0450	313810662131	CARTON
0451	313810662141	CUSHION-TOP
0452	313810662151	CUSHION-BOTTOM
0454	313810656651	PE BAG

Accessories

0601	313811705601	E-D.F.U. ASSY
1053	313816874231	MAINS CORD
1054	313818878341	CORD SUB-D 15/1M8/13 330943 UL

Others

0212	313811577881	LABEL-CPU
0213	313811577891	LABEL-EEPROM(LPL)
0615	313811705001	HEX CODE OF F/W (NO MATL)
1101	242208600208	FUSE 5X20 HT 4A 250V IEC B
1104	242213207402	RELAY 1P 12V 10/80A SDT-SS L

CRT

1151	930193050323	CRT M46QEF903X01(H) (LGPD) B
1151	930195230323	CRT M46QEF903X01(H)M (LGPD) B
1151	823827444501	CRT M46QCK761x123(TCO/MDT)
1151	823827444481	CRT M46AJS53X76(MV)

Main PCB

1152	313817863851	MB-1 ASSY (109B5)
1152	313817865191	MB-2 ASSY (SDI-109B5)
1152	313817866071	MB-3 ASSY
1153	313817865171	VB ASSY (LG-109B5)
1153	313817866101	VB-2 ASSY (SDI/CPT-109B5)
1154	313817865181	C/B ASSY
1155	313817863681	MHR ASSY 109B5

Main Board (313817863851) MB-1 ASSY (LG)

2103	203831000014	CAP MPP 275V S 680N PM10 B
2104	202055490163	CERSAF NSB 250V S 2N2 PM20 B
2105	202055490163	CERSAF NSB 250V S 2N2 PM20 B
2106	203803524008	ELCAP LP 400V S 150U PM20 B
2107	203830250229	CAP MPOL 250V S 10N PM5 A
2111	225260214216	CER2 DC X7R 2KV S 220P PM10 A
2112	202055490158	CERSAF CD 250V S 2N2 PM20 B
2113	202055290834	CER2 DC F 50V S 22N P8020 A
2115	202203600002	ELCAP BP NK 50V S 1U PM20 A
2121	202055290607	CER1 DC NP0 50V S 220P PM5 A
2123	203803521306	ELCAP GS 25V S 47U PM20 A
2124	223858015645	CER2 0805 X7R 50V 47N PM10 R
2131	202055290814	CER2 DC B 50V S 3N3 PM10 A
2133	203830250219	CAP MPOL 100V S 22N PM5 A
2134	225256108406	CER1 DC SL 1KV S 47P PM10 A
2139	203830250229	CAP MPOL 250V S 10N PM5 A
2141	203803521201	ELCAP GS 16V S 10U PM20 A
2142	202202000716	ELCAP GS 10V S 4700U PM20 B
2143	203803521206	ELCAP GS 16V S 47U PM20 A
2144	203803521206	ELCAP GS 16V S 47U PM20 A
2145	202055790151	CER2 DC B 500V S 1N PM10 A
2146	203803521206	ELCAP GS 16V S 47U PM20 A
2147	203803521304	ELCAP GS 25V S 22U PM20 A
2150	225260214216	CER2 DC X7R 2KV S 220P PM10 A
2151	202203100151	ELCAP KF 100V S 100U PM20 B
2152	202202000717	ELCAP GS 160V S 47U PM20 B
2153	202203100149	ELCAP KM 16V S 1000U PM20 B
2154	203803527307	ELCAP KM 25V S 470U PM20 A
2155	202203100149	ELCAP KM 16V S 1000U PM20 B
2401	203803521218	ELCAP GS 16V S 470U PM20 A
2402	203803521404	ELCAP GS 35V S 47U PM20 A
2403	203803521218	ELCAP GS 16V S 470U PM20 A
2405	203830250125	CAP MPOL 100V S 220N PM10 A
2411	223886115151	CER1 0805 NP0 50V 150P PM5 R
2412	223858015641	CER2 0805 X7R 50V 22N PM10 R
2413	223858015632	CER2 0805 X7R 50V 4N7 PM10 R
2414	203830250218	CAP MPOL 100V S 10N PM2 A
2415	202055290816	CER2 DC B 50V S 4N7 PM10 A
2417	203803521207	ELCAP GS 16V S 100U PM20 A
2418	202202000805	ELCAP GS 50V S 2U2 PM20 A
2419	202202000805	ELCAP GS 50V S 2U2 PM20 A
2420	203803521501	ELCAP GS 50V S 10U PM20 A
2431	223858015641	CER2 0805 X7R 50V 22N PM10 R
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2502	202055290597	CER1 DC NP0 50V S 39P PM5 A
2503	202055290807	CER2 DC B 50V S 1N PM10 A
2504	203830250095	CAP MPOL 100V S 100N PM10 A
2505	203803521209	ELCAP GS 16V S 220U PM20 A
2506	223858015635	CER2 0805 X7R 50V 8N2 PM10 R
2507	223891015649	CER2 0805 X7R 25V 100N PM10 R
2508	203830250218	CAP MPOL 100V S 10N PM2 A
2509	202055290603	CER1 DC NP0 50V S 100P PM5 A
2511	203830150157	CAP PP PPN 100V S 5N6 PM2 A
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2522	203830250125	CAP MPOL 100V S 220N PM10 A
2524	203830150135	CAP PP PPN 100V S 2N2 PM5 R
2601	202055290821	CER2 DC B 50V S 10N PM10 A
2602	203830250099	CAP MPOL 100V S 470N PM10 A
2603	203803522801	ELCAP BP NK 160V S 1U PM20 A
2606	225260214216	CER2 DC X7R 2KV S 220P PM10 A
2607	225260214216	CER2 DC X7R 2KV S 220P PM10 A
2608	203830150191	CAP PP PPN 100V S 3N3 PM2 A
2611	202233300222	CAP PP-MPP 2KV S 4N7 PM5 B
2616	225260114416	CER2 DC X7R 1KV S 470P PM10 A
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2622	202203100154	ELCAP KM 250V S 33U PM20 B
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2624	203803527304	ELCAP KM 25V S 100U PM20 A
2625	203803527304	ELCAP KM 25V S 100U PM20 A
2626	203830100425	CAP MPP MPSA 400V S 270N PM5 B
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2631	202055890604	CERHDT RR 2KV S 100P PM10 A
2632	225271214116	CERHDT F-Y5R 2KV S 150P PM10 A
2633	202055890556	CERHDT RR 1KV S 680P PM10 A
2634	203803527501	ELCAP KM 50V S 10U PM20 A
2638	203830100315	CAP MPP MPS 250V S 100N PM5 B
2640	203830100224	CAP MPP MPS 250V S 220N PM5 B
2642	203830100332	CAP MPP MPS 250V S 510N PM5 B
2647	203830100217	CAP MPP MPS 250V S 1U5 PM5 B
2671	202203100151	ELCAP KF 100V S 100U PM20 B
2672	203803527701	ELCAP KM 100V S 4U7 PM20 A
2673	203830200203	CAP MPOL 630V S 47N PM10 B
2674	203830100109	CAP PP PPN 630V S 3N3 PM5 B
2675	202055290812	CER2 DC B 50V S 2N2 PM10 A
2676	203803513803	ELCAP RGA 160V S 10U PM20 B
2681	203830200151	CAP MPOL 250V S 47N PM10 B
2682	202202000836	ELCAP GS 50V S 1U PM20 A
2683	203830200209	CAP MPOL 100V S 1U PM5 B
2685	203830250099	CAP MPOL 100V S 470N PM10 A
2806	203803521206	ELCAP GS 16V S 47U PM20 A
2813	223886115109	CER1 0805 NP0 50V 10P PM5 R
2814	203803521206	ELCAP GS 16V S 47U PM20 A
2815	223886115109	CER1 0805 NP0 50V 10P PM5 R
2816	223886115221	CER1 0805 NP0 50V 220P PM5 R
2817	202202000805	ELCAP GS 50V S 2U2 PM20 A
2818	202055290834	CER2 DC F 50V S 22N P8020 A
2819	223886115101	CER1 0805 NP0 50V 100P PM5 R
2821	202055290834	CER2 DC F 50V S 22N P8020 A
2824	202202000805	ELCAP GS 50V S 2U2 PM20 A
2825	202202000805	ELCAP GS 50V S 2U2 PM20 A
2826	223858015641	CER2 0805 X7R 50V 22N PM10 R
2827	202055290603	CER1 DC NP0 50V S 100P PM5 A
2828	202055290603	CER1 DC NP0 50V S 100P PM5 A
2835	202202000805	ELCAP GS 50V S 2U2 PM20 A
3101	232224213105	RST MGL VR37 A 1M PM5 A
3104	313810050511	MET FLM RST RSS2T 47K 6E
3105	212020200019	RST FUSE RFU1/3 A 10R PM5 A
3107	213810113102	RST CRB CFR-12 A 1K PM5 A
3108	213811273477	RST CRB CFR-25 A 0R47 PM5 A
3109	213811273477	RST CRB CFR-25 A 0R47 PM5 A
3110	213811273477	RST CRB CFR-25 A 0R47 PM5 A
3113	213811273477	RST CRB CFR-25 A 0R47 PM5 A
3115	213810113331	RST CRB CFR-12 A 330R PM5 A
3117	213810113103	RST CRB CFR-12 A 10K PM5 A
3121	213810113159	RST CRB CFR-12 A 15R PM5 A
3124	213866000037	PTC DBL-MON0 270V 4R5 P3020 B
3125	213810113391	RST CRB CFR-12 A 390R PM5 A
3127	213810100369	RST JUMP CR-12 A MAX 0R01 A
3128	212211000423	RST MFLM MF1/2WS A 330K PM1 A
3131	232273061273	RST SM 0805 RC11 27K PM5 R
3134	212211000419	RST MFLM MF1/2WS A 240K PM1 A
3138	232273061154	RST SM 0805 RC11 150K PM5 R
3139	213811273332	RST CRB CFR-25 A 3K3 PM5 A
3140	212211000412	RST MFLM MF1/2WS A 120K PM1 A
3141	213810113102	RST CRB CFR-12 A 1K PM5 A
3142	213810113154	RST CRB CFR-12 A 150K PM5 A
3144	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A
3145	212211000339	RST MFLM MF1/2WS A 240R PM1 A
3146	213810113479	RST CRB CFR-12 A 47R PM5 A
3147	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3149	212211000409	RST MFLM MF1/2WS A 100K PM1 A
3153	212211000376	RST MFLM MF1/2WS A 5K6 PM1 A
3154	232273061102	RST SM 0805 RC11 1K PM5 R
3156	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3403	212211000338	RST MFLM MF1/2WS A 220R PM1 A
3405	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3406	212211000302	RST MFLM MF1/2WS A 1R8 PM1 A
3407	212211000302	RST MFLM MF1/2WS A 1R8 PM1 A
3408	212261200062	NTC DC TTC-501 S 500R PM5 A
3409	232273061222	RST SM 0805 RC11 2K2 PM5 R
3411	232273061154	RST SM 0805 RC11 150K PM5 R
3412	232273061473	RST SM 0805 RC11 47K PM5 R
3413	213810113152	RST CRB CFR-12 A 1K5 PM5 A
3415	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3416	232273061479	RST SM 0805 RC11 47R PM5 R
3417	232273061103	RST SM 0805 RC11 10K PM5 R
3418	232273061822	RST SM 0805 RC11 8K2 PM5 R
3419	213811273479	RST CRB CFR-25 A 47R PM5 A
3420	213810113331	RST CRB CFR-12 A 330R PM5 A
3421	232273061103	RST SM 0805 RC11 10K PM5 R
3422	213810113101	RST CRB CFR-12 A 100R PM5 A
3423	213810113334	RST CRB CFR-12 A 330K PM5 A
3424	213810113223	RST CRB CFR-12 A 22K PM5 A
3425	232273061473	RST SM 0805 RC11 47K PM5 R
3426	232273061473	RST SM 0805 RC11 47K PM5 R
3427	232273061472	RST SM 0805 RC11 4K7 PM5 R
3431	212020200019	RST FUSE RFU1/3 A 10R PM5 A
3432	232273061471	RST SM 0805 RC11 470R PM5 R
3433	232273061121	RST SM 0805 RC11 120R PM5 R
3501	213810113752	RST CRB CFR-12 A 7K5 PM5 A
3502	213810113273	RST CRB CFR-12 A 27K PM5 A
3503	212211000385	RST MFLM MF1/2WS A 12K PM1 A
3504	213810113123	RST CRB CFR-12 A 12K PM5 A
3505	213810113473	RST CRB CFR-12 A 47K PM5 A
3507	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3508	232224182704	RST MGL VR25 A 270K PM1 A
3509	213810113152	RST CRB CFR-12 A 1K5 PM5 A
3510	212211000349	RST MFLM MF1/2WS A 560R PM1 A
3512	213810113153	RST CRB CFR-12 A 15K PM5 A
3513	213810113471	RST CRB CFR-12 A 470R PM5 A
3515	213810113153	RST CRB CFR-12 A 15K PM5 A
3516	232224181004	RST MGL VR25 A 100K PM1 A
3517	232273061155	RST SM 0805 RC11 1M5 PM5 R
3518	232273061154	RST SM 0805 RC11 150K PM5 R
3519	213810113225	RST CRB CFR-12 A 2M2 PM5 A
3522	212211000311	RST MFLM MF1/2WS A 4R7 PM1 A
3523	232273061332	RST SM 0805 RC11 3K3 PM5 R

3524	212211000445	RST MFLM MF1/2WS A 732R PM1 A
3525	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A
3528	213810113822	RST CRB CFR-12 A 8K2 PM5 A
3553	212211000392	RST MFLM MF1/2WS A 22K PM1 A
3554	213810113102	RST CRB CFR-12 A 1K PM5 A
3555	213810113102	RST CRB CFR-12 A 1K PM5 A
3558	232224181804	RST MGL VR25 A 180K PM1 A
3567	213810113101	RST CRB CFR-12 A 100R PM5 A
3568	213810113101	RST CRB CFR-12 A 100R PM5 A
3569	213810113339	RST CRB CFR-12 A 33R PM5 A
3576	213810113101	RST CRB CFR-12 A 100R PM5 A
3577	213810113101	RST CRB CFR-12 A 100R PM5 A
3601	213810113102	RST CRB CFR-12 A 1K PM5 A
3602	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3603	232273061101	RST SM 0805 RC11 100R PM5 R
3604	213810500061	RST MOX 2W RSS S 15K PM5 B
3605	212010592186	RST MOX 3W RSS S 680R PM5 B
3606	212010592383	RST MOX 2W RSS S 2R2 PM5 B
3607	212010592399	RST MOX 3W RSS S 1R5 PM5 B
3608	212211000327	RST MFLM MF1/2WS A 68R PM1 A
3609	213811273271	RST CRB CFR-25 A 270R PM5 A
3610	212010592163	RST MOX 2W RSS S 1K PM5 B
3611	212211000329	RST MFLM MF1/2WS A 100R PM1 A
3612	213811273391	RST CRB CFR-25 A 390R PM5 A
3613	212010592389	RST MOX 2W RSS S 15R PM5 B
3614	213811273108	RST CRB CFR-25 A 1R PM5 A
3615	232273061102	RST SM 0805 RC11 1K PM5 R
3616	212010592388	RST MOX 2W RSS S 33R PM5 B
3618	212020200012	RST FUSE RFS1/2 A 100R PM5 A
3619	213810113223	RST CRB CFR-12 A 22K PM5 A
3621	212020200015	RST FUSE RFU1/3 A 1R PM5 A
3622	232273061103	RST SM 0805 RC11 10K PM5 R
3623	213810113104	RST CRB CFR-12 A 100K PM5 A
3624	213810113123	RST CRB CFR-12 A 12K PM5 A
3625	213810113103	RST CRB CFR-12 A 10K PM5 A
3626	212010593644	RST MOX 1W RSS A 33K PM5 A
3627	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3628	213810113103	RST CRB CFR-12 A 10K PM5 A
3629	232273061102	RST SM 0805 RC11 1K PM5 R
3630	212211000317	RST MFLM MF1/2WS A 15R PM1 A
3631	232224213224	RST MGL VR37 A 220K PM5 A
3633	212211000406	RST MFLM MF1/2WS A 75K PM1 A
3635	232224213434	RST MGL VR37 A 430K PM5 A
3636	212211000442	RST MFLM MF1/2WS A 4M7 PM1 A
3637	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3638	212211000346	RST MFLM MF1/2WS A 430R PM1 A
3639	213810113223	RST CRB CFR-12 A 22K PM5 A
3647	232273061154	RST SM 0805 RC11 150K PM5 R
3650	213810113682	RST CRB CFR-12 A 6K8 PM5 A
3651	213810113102	RST CRB CFR-12 A 1K PM5 A
3652	213810113154	RST CRB CFR-12 A 150K PM5 A
3655	213810113682	RST CRB CFR-12 A 6K8 PM5 A
3656	213810113102	RST CRB CFR-12 A 1K PM5 A
3657	213810113154	RST CRB CFR-12 A 150K PM5 A
3660	213810113682	RST CRB CFR-12 A 6K8 PM5 A
3661	213810113102	RST CRB CFR-12 A 1K PM5 A
3662	213810113154	RST CRB CFR-12 A 150K PM5 A
3665	213810113682	RST CRB CFR-12 A 6K8 PM5 A
3666	213810113102	RST CRB CFR-12 A 1K PM5 A
3667	213810113103	RST CRB CFR-12 A 10K PM5 A
3668	213810113103	RST CRB CFR-12 A 10K PM5 A
3669	213810113104	RST CRB CFR-12 A 100K PM5 A
3670	213810113473	RST CRB CFR-12 A 47K PM5 A
3671	213810113103	RST CRB CFR-12 A 10K PM5 A
3680	212020200015	RST FUSE RFU1/3 A 1R PM5 A
3681	212020200019	RST FUSE RFU1/3 A 10R PM5 A
3682	213810113471	RST CRB CFR-12 A 470R PM5 A
3683	212211000427	RST MFLM MF1/2WS A 470K PM1 A
3684	213810113912	RST CRB CFR-12 A 9K1 PM5 A
3685	232273061333	RST SM 0805 RC11 33K PM5 R
3686	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3687	232273061333	RST SM 0805 RC11 33K PM5 R
3688	213810113103	RST CRB CFR-12 A 10K PM5 A
3689	232273061224	RST SM 0805 RC11 220K PM5 R
3690	213810113334	RST CRB CFR-12 A 330K PM5 A
3691	213810113152	RST CRB CFR-12 A 1K5 PM5 A
3692	212211000349	RST MFLM MF1/2WS A 560R PM1 A
3693	232273061472	RST SM 0805 RC11 4K7 PM5 R
3694	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3695	212020200019	RST FUSE RFU1/3 A 10R PM5 A
3696	232273061105	RST SM 0805 RC11 1M PM5 R
3697	212211000436	RST MFLM MF1/2WS A 1M PM1 A
3698	213810113683	RST CRB CFR-12 A 68K PM5 A
3699	213836500084	RTRM CER LIN 20K V VG067TH1 B
3811	213810113153	RST CRB CFR-12 A 15K PM5 A
3812	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3813	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3814	213810113561	RST CRB CFR-12 A 560R PM5 A
3815	213810113101	RST CRB CFR-12 A 100R PM5 A
3816	213810113392	RST CRB CFR-12 A 3K9 PM5 A
3817	212211000392	RST MFLM MF1/2WS A 22K PM1 A
3818	213810113101	RST CRB CFR-12 A 100R PM5 A
3821	232273061472	RST SM 0805 RC11 4K7 PM5 R
3822	232273061222	RST SM 0805 RC11 2K2 PM5 R
3823	232273061472	RST SM 0805 RC11 4K7 PM5 R
3825	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3827	213810113103	RST CRB CFR-12 A 10K PM5 A
3828	213810113101	RST CRB CFR-12 A 100R PM5 A
3829	213810113101	RST CRB CFR-12 A 100R PM5 A
3830	232273061272	RST SM 0805 RC11 2K7 PM5 R
3831	213810113223	RST CRB CFR-12 A 22K PM5 A
3833	232273061472	RST SM 0805 RC11 4K7 PM5 R
3834	213810113332	RST CRB CFR-12 A 3K3 PM5 A
3835	232273061472	RST SM 0805 RC11 4K7 PM5 R
3837	213810113103	RST CRB CFR-12 A 10K PM5 A
3838	213810113101	RST CRB CFR-12 A 100R PM5 A
3839	232273061472	RST SM 0805 RC11 4K7 PM5 R
3840	213810113223	RST CRB CFR-12 A 22K PM5 A
3841	213810113101	RST CRB CFR-12 A 100R PM5 A
3842	213810113101	RST CRB CFR-12 A 100R PM5 A
3843	213810113223	RST CRB CFR-12 A 22K PM5 A
3844	232273061472	RST SM 0805 RC11 4K7 PM5 R
3845	213810113479	RST CRB CFR-12 A 47R PM5 A
3847	232273061472	RST SM 0805 RC11 4K7 PM5 R
3871	213810113472	RST CRB CFR-12 A 4K7 PM5 A
5007	313818878331	COIL DEGAUS 62-9703-15 F
5101	243853598058	IND FXD BEAD EMI 100MHZ 80R A
5102	243853598058	IND FXD BEAD EMI 100MHZ 80R A
5103	313816874511	FERRITE BEAD
5108	313817870891	LINE FILTER 15 mH MIN.
5113	313818874691	TFM SMT LAYER SRW35EC-T81V11
5122	242253597416	IND FXD SP0406 A 33U PM10 B
5123	242253600036	IND FXD TSL0808 S 100U PM10 A
5124	242253600036	IND FXD TSL0808 S 100U PM10 A
5125	242253600039	IND FXD TSL0808 S 180U PM10 A
5126	242253600039	IND FXD TSL0808 S 180U PM10 A
5601	313818878231	TFM SIG DRIVER SRW16UW-T14H00
5602	313817871732	DRUM COIL 20MH
5603	313818878261	TFM SIG DRIVER SRW25EF-T24V00
5604	313818878241	COI CHOKE 6000UH6.8OHM DR10X12
5606	313818878221	COI LINCOR 1.80UH HL2455H-083N
5608	313816872631	BEAD COIL
5610	313816872621	BEAD COIL (BF30TA-2.5X3X1B)
5611	313818878251	TFM POW DAF SRW19ES-T38V005
5681	313818878571	TFM LOT LAYER 11MM WIRE
5682	242253600039	IND FXD TSL0808 S 180U PM10 A
6101	932215736682	BRIDGE GBU4K (PAJI) B
6103	933497950673	DIO REC RGP10J A (VISH) A
6106	933751660673	DIO REC RGP10D A (VISH) A
6107	933497950673	DIO REC RGP10J A (VISH) A
6109	933256030673	DIO SIG 1N4148 A (VISH) A
6113	933189210133	DIO SIG BAV21 A (PHSE) A
6118	933913910115	DIO SIG SM BAS32L (PHSE) R
6131	933730980133	DIO REC BYV36C A (PHSE) A
6132	933166850133	DIO REG BZX79-B8V2 A (PHSE) A
6133	932211574682	DIO REC 31DF4-FC5 (NIEC0 B
6134	933957760673	DIO REC SB140 A (VISH) A
6135	932210346673	DIO REC SBYV27-200 A (VISH) A
6136	932210346673	DIO REC SBYV27-200 A (VISH) A
6140	933256030673	DIO SIG 1N4148 A (VISH) A
6141	933751660673	DIO REC RGP10D A (VISH) A
6143	933256030673	DIO SIG 1N4148 A (VISH) A
6144	933497950673	DIO REC RGP10J A (VISH) A
6146	933256030673	DIO SIG 1N4148 A (VISH) A
6147	933117760133	DIO REG BZX79-C7V5 A (PHSE) A
6401	933957760673	DIO REC SB140 A (VISH) A
6411	933913910115	DIO SIG SM BAS32L (PHSE) R
6412	933256030673	DIO SIG 1N4148 A (VISH) A
6413	933913910115	DIO SIG SM BAS32L (PHSE) R
6414	933913910115	DIO SIG SM BAS32L (PHSE) R
6415	933913910115	DIO SIG SM BAS32L (PHSE) R
6421	933751660673	DIO REC RGP10D A (VISH) A
6501	933256030673	DIO SIG 1N4148 A (VISH) A
6502	933256030673	DIO SIG 1N4148 A (VISH) A
6503	933256030673	DIO SIG 1N4148 A (VISH) A
6601	933117810133	DIO REG BZX79-C12 A (PHSE) A
6602	933493960673	DIO REC RGP10G A (VISH) A
6605	933751660673	DIO REC RGP10D A (VISH) A
6606	933957760673	DIO REC SB140 A (VISH) A
6608	933189210133	DIO SIG BAV21 A (PHSE) A
6609	933117710133	DIO REG BZX79-C4V7 A (PHSE) A
6621	932205787683	DIO REC EGP20G A (VISH) R
6622	933117830133	DIO REG BZX79-C15 A (PHSE) A
6623	933189210133	DIO SIG BAV21 A (PHSE) A
6626	933751660673	DIO REC RGP10D A (VISH) A
6671	933751660673	DIO REC RGP10D A (VISH) A
6672	933166910133	DIO REG BZX79-B15 A (PHSE) A
6673	933166990133	DIO REG BZX79-B33 A (PHSE) A
6674	933497950673	DIO REC RGP10J A (VISH) A
6675	933256030673	DIO SIG 1N4148 A (VISH) A
6676	932212636682	DIO REC 31DF6-FC5 (NIEC) B
6677	933497950673	DIO REC RGP10J A (VISH) A
6681	933256030673	DIO SIG 1N4148 A (VISH) A
6682	933913910115	DIO SIG SM BAS32L (PHSE) R
6802	933256030673	DIO SIG 1N4148 A (VISH) A
6820	933117730133	DIO REG BZX79-C5V6 A (PHSE) A
6821	933117730133	DIO REG BZX79-C5V6 A (PHSE) A
7102	935267356112	IC TEA1507P/N1 (PHSE) L
7103	933953420676	TRA SIG TBC338-40 (TOSJ) A
7111	932214014667	OPT CP TCET1103(G) (VISH) L
7112	932208697676	IC TL431ACZ-AP S (ST00) A
7113	933953420676	TRA SIG TBC338-40 (TOSJ) A
7114	932208234676	IC L78L05ACZ (ST00) A
7115	933826850126	THYRIS BT169B (PHSE) A
7116	932209011673	TRA SIG BC548C (KEC0) A
7117	933920810682	IC L7808CV (ST00) L
7411	932201959682	IC UC3843AN (MOTA) L
7412	932216833676	TRA SIG BC547C (KEC0) A
7413	932217438685	TRA SIG SM BC847C (KEC0) R
7414	932217438685	TRA SIG SM BC847C (KEC0) R
7431	932217438685	TRA SIG SM BC847C (KEC0) R
7501	935267455112	IC TDA4841PS/V3 (PHSE) L
7502	933450090126	TRA SIG PH2369 (PHSE) A
7503	932214472676	TRA SIG BF423 (KEC0) A
7505	932210142676	TRA SIG BC558C (KEC0) A
7601	934003960126	FET SIG BSN254A (PHSE) A
7611	932216831676	TRA SIG BC337-40 (KEC0) A
7616	932218832687	FET POW FQP6P25 (FSC0) L
7617	933953420676	TRA SIG TBC338-40 (TOSJ) A
7618	933953410676	TRA SIG TBC328-40 (TOSJ) A
7619	932209011673	TRA SIG BC548C (KEC0) A
7620	932214474676	TRA SIG BC517 (KEC0) A
7621	933567120126	TRA SIG BC516 (PHSE) A
7626	933567120126	TRA SIG BC516 (PHSE) A
7627	932214474676	TRA SIG BC517 (KEC0) A
7628	932214469676	TRA SIG BF422 (KEC0) A
7629	932210142676	TRA SIG BC558C (KEC0) A
7631	934025870126	TRA SIG MPSA44 (PHSE) A
7638	932217995687	FET POW IRF630B (FSC0) L
7639	932216833676	TRA SIG BC547C (KEC0) A
7640	932217996687	FET POW IRF640B (FSC0) L
7641	932216833676	TRA SIG BC547C (KEC0) A
7643	932216833676	TRA SIG BC547C (KEC0) A
7646	932216833676	TRA SIG BC547C (KEC0) A
7647	932209011673	TRA SIG BC548C (KEC0) A
7648	932209011673	TRA SIG BC548C (KEC0) A
7673	933450090126	TRA SIG PH2369 (PHSE) A
7681	933967380685	TRA SIG SM BC858C (ONSE) R
7801	823827444541	CPU,IC
7803	932212662682	IC M24C16-BN6 (ST00) L
7831	932209011673	TRA SIG BC548C (KEC0) A

Spare Parts List

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VB-1 ASSY(313817865171) (LG-109B5)

2306	223886115101	CER1 0805 NP0 50V 100P PM5 R
2307	223886115479	CER1 0805 NP0 50V 47P PM5 R
2308	223891015649	CER2 0805 X7R 25V 100N PM10 R
2309	223891015649	CER2 0805 X7R 25V 100N PM10 R
2311	223891015649	CER2 0805 X7R 25V 100N PM10 R
2312	223891015649	CER2 0805 X7R 25V 100N PM10 R
2319	223891015649	CER2 0805 X7R 25V 100N PM10 R
2322	223858015636	CER2 0805 X7R 50V 10N PM10 R
2323	223858015636	CER2 0805 X7R 50V 10N PM10 R
2324	203803521306	ELCAP GS 25V S 47U PM20 A
2336	223891015649	CER2 0805 X7R 25V 100N PM10 R
2337	223891015649	CER2 0805 X7R 25V 100N PM10 R
2338	223891015649	CER2 0805 X7R 25V 100N PM10 R
2341	203803527303	ELCAP KM 25V S 47U PM20 A
2342	223891015649	CER2 0805 X7R 25V 100N PM10 R
2353	223891015649	CER2 0805 X7R 25V 100N PM10 R
2354	223891015649	CER2 0805 X7R 25V 100N PM10 R
2356	203803526301	ELCAP LL 25V S 10U PM10 A
2702	223891015649	CER2 0805 X7R 25V 100N PM10 R
2721	203803527703	ELCAP KM 100V S 22U PM20 A
2722	225232626104	CER2 ML X7R 100V S 100N PM10 A
2723	203803522801	ELCAP BP NK 160V S 1U PM20 A
2724	203803527303	ELCAP KM 25V S 47U PM20 A
2725	242254945382	SURGE PROTECT SGP-201M-DRF A
2726	203803521303	ELCAP GS 25V S 10U PM20 A
2727	202203100153	ELCAP KM 100V S 1U PM20 A
2728	202055790151	CER2 DC B 500V S 1N PM10 A
2729	203803527702	ELCAP KM 100V S 10U PM20 A
2730	203803521306	ELCAP GS 25V S 47U PM20 A
2731	203803522801	ELCAP BP NK 160V S 1U PM20 A
2732	202203100153	ELCAP KM 100V S 1U PM20 A
2733	242254945382	SURGE PROTECT SGP-201M-DRF A
2751	203803522801	ELCAP BP NK 160V S 1U PM20 A
2752	202203100153	ELCAP KM 100V S 1U PM20 A
2753	242254945382	SURGE PROTECT SGP-201M-DRF A
2760	223886115471	CER1 0805 NP0 50V 470P PM5 R
2761	203803521306	ELCAP GS 25V S 47U PM20 A
2763	223858015632	CER2 0805 X7R 50V 4N7 PM10 R
2771	223891015649	CER2 0805 X7R 25V 100N PM10 R
2772	225261808311	CER2 DC Y5P 500V S 330P PM10 A
2773	223891015649	CER2 0805 X7R 25V 100N PM10 R
2774	223891015649	CER2 0805 X7R 25V 100N PM10 R
2776	223891015649	CER2 0805 X7R 25V 100N PM10 R
2778	203803527303	ELCAP KM 25V S 47U PM20 A
2779	223891015649	CER2 0805 X7R 25V 100N PM10 R
2781	223891015649	CER2 0805 X7R 25V 100N PM10 R
2782	203830250095	CAP MPOL 100V S 100N PM10 A
2783	223555900099	CER2 DC 2KV S 10N PM20 B
2787	223891015649	CER2 0805 X7R 25V 100N PM10 R
3301	213810113759	RST CRB CFR-12 A 75R PM5 A
3302	213810113759	RST CRB CFR-12 A 75R PM5 A
3303	213810113759	RST CRB CFR-12 A 75R PM5 A
3304	213810113479	RST CRB CFR-12 A 47R PM5 A
3305	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3306	213810113472	RST CRB CFR-12 A 4K7 PM5 A
3307	213810113101	RST CRB CFR-12 A 100R PM5 A
3308	213810113101	RST CRB CFR-12 A 100R PM5 A
3309	232273061102	RST SM 0805 RC11 1K PM5 R
3310	232273061102	RST SM 0805 RC11 1K PM5 R
3311	232273061102	RST SM 0805 RC11 1K PM5 R
3312	213810113689	RST CRB CFR-12 A 68R PM5 A
3313	213810113689	RST CRB CFR-12 A 68R PM5 A
3314	213810113689	RST CRB CFR-12 A 68R PM5 A
3315	213810113479	RST CRB CFR-12 A 47R PM5 A
3316	213810113101	RST CRB CFR-12 A 100R PM5 A
3317	213810113222	RST CRB CFR-12 A 2K2 PM5 A
3318	232273061102	RST SM 0805 RC11 1K PM5 R
3319	232273061102	RST SM 0805 RC11 1K PM5 R
3323	213810113332	RST CRB CFR-12 A 3K3 PM5 A
3324	232273061332	RST SM 0805 RC11 3K3 PM5 R
3325	213810113822	RST CRB CFR-12 A 8K2 PM5 A
3326	213810113332	RST CRB CFR-12 A 3K3 PM5 A
3327	232273061562	RST SM 0805 RC11 5K6 PM5 R
3328	232273061332	RST SM 0805 RC11 3K3 PM5 R
3329	232273061562	RST SM 0805 RC11 5K6 PM5 R
3330	232273061105	RST SM 0805 RC11 1M PM5 R
3332	232273061101	RST SM 0805 RC11 100R PM5 R
3333	232273061101	RST SM 0805 RC11 100R PM5 R
3334	232273061479	RST SM 0805 RC11 47R PM5 R
3361	213810113101	RST CRB CFR-12 A 100R PM5 A
3362	232273061101	RST SM 0805 RC11 100R PM5 R
3363	232273061101	RST SM 0805 RC11 100R PM5 R
3367	213810113478	RST CRB CFR-12 A 4R7 PM5 A
3376	232273061689	RST SM 0805 RC11 68R PM5 R
3378	213810113689	RST CRB CFR-12 A 68R PM5 A
3381	232273061689	RST SM 0805 RC11 68R PM5 R
3383	213810113101	RST CRB CFR-12 A 100R PM5 A
3385	232273061478	RST SM 0805 RC11 4R7 PM5 R
3704	213811273479	RST CRB CFR-25 A 47R PM5 A
3705	212211000329	RST MFLM MF1/2WS A 100R PM1 A
3706	213810113479	RST CRB CFR-12 A 47R PM5 A
3707	213810113101	RST CRB CFR-12 A 100R PM5 A
3716	212211000392	RST MFLM MF1/2WS A 22K PM1 A
3718	212211000392	RST MFLM MF1/2WS A 22K PM1 A
3719	212211000392	RST MFLM MF1/2WS A 22K PM1 A
3721	232273061471	RST SM 0805 RC11 470R PM5 R
3722	232273061122	RST SM 0805 RC11 1K2 PM5 R
3723	232273061224	RST SM 0805 RC11 220K PM5 R
3724	232273061223	RST SM 0805 RC11 22K PM5 R
3725	232273061683	RST SM 0805 RC11 68K PM5 R
3726	213810113334	RST CRB CFR-12 A 330K PM5 A
3727	213810113109	RST CRB CFR-12 A 10R PM5 A
3728	212010128121	RST CMP ERC12 A 120R PM10 A
3729	232273061829	RST SM 0805 RC11 82R PM5 R
3731	212010128121	RST CMP ERC12 A 120R PM10 A
3732	232273061109	RST SM 0805 RC11 10R PM5 R
3733	213810113471	RST CRB CFR-12 A 470R PM5 A
3734	213810113334	RST CRB CFR-12 A 330K PM5 A
3735	232273061122	RST SM 0805 RC11 1K2 PM5 R
3736	232273061224	RST SM 0805 RC11 220K PM5 R
3737	232273061683	RST SM 0805 RC11 68K PM5 R
3738	232273061223	RST SM 0805 RC11 22K PM5 R
3739	232273061829	RST SM 0805 RC11 82R PM5 R
3751	232273061471	RST SM 0805 RC11 470R PM5 R
3752	213810113334	RST CRB CFR-12 A 330K PM5 A
3753	232273061122	RST SM 0805 RC11 1K2 PM5 R
3754	232273061224	RST SM 0805 RC11 220K PM5 R
3755	232273061683	RST SM 0805 RC11 68K PM5 R
3756	232273061223	RST SM 0805 RC11 22K PM5 R
3757	213810113109	RST CRB CFR-12 A 10R PM5 A
3758	212010128121	RST CMP ERC12 A 120R PM10 A
3759	213810113829	RST CRB CFR-12 A 82R PM5 A
3761	213810113478	RST CRB CFR-12 A 4R7 PM5 A
3762	232273061103	RST SM 0805 RC11 10K PM5 R
3763	232273061332	RST SM 0805 RC11 3K3 PM5 R
3764	232273061472	RST SM 0805 RC11 4K7 PM5 R
3765	232273061682	RST SM 0805 RC11 6K8 PM5 R
3767	232273061472	RST SM 0805 RC11 4K7 PM5 R
3771	232224522152	RST MGL LSR37 A 1K5 PM10 R
3772	212010128153	RST CMP ERC12 A 15K PM10 A
3778	213810113102	RST CRB CFR-12 A 1K PM5 A
5301	242253597608	IND FXD SPT0305 A 1U8 PM10 R
5303	313816872621	BEAD COIL (BF30TA-2.5X3X1B)
5305	313816872621	BEAD COIL (BF30TA-2.5X3X1B)
5307	242253597608	IND FXD SPT0305 A 1U8 PM10 R
5702	242253597608	IND FXD SPT0305 A 1U8 PM10 R
5705	242253597608	IND FXD SPT0305 A 1U8 PM10 R
5721	242253597064	IND FXD SP0305 A 0U33 PM20 B
5751	242253597064	IND FXD SP0305 A 0U33 PM20 B
5752	242253597064	IND FXD SP0305 A 0U33 PM20 B
5771	243853598058	IND FXD BEAD EMI 100MHZ 80R A
5779	242253597608	IND FXD SPT0305 A 1U8 PM10 R
6301	933117810133	DIO REG BZX79-C12 A (PHSE) A
6302	933117810133	DIO REG BZX79-C12 A (PHSE) A
6303	933117810133	DIO REG BZX79-C12 A (PHSE) A
6304	933117730133	DIO REG BZX79-C5V6 A (PHSE) A
6721	933189210133	DIO SIG BAV21 A (PHSE) A
6722	933189210133	DIO SIG BAV21 A (PHSE) A
6723	933952580685	DIO SIG SM BAV103 (VISH) R
6731	933189210133	DIO SIG BAV21 A (PHSE) A
6732	933189210133	DIO SIG BAV21 A (PHSE) A
6733	933952580685	DIO SIG SM BAV103 (VISH) R
6751	933189210133	DIO SIG BAV21 A (PHSE) A
6752	933189210133	DIO SIG BAV21 A (PHSE) A
6753	933952580685	DIO SIG SM BAV103 (VISH) R
6771	933493960673	DIO REC RGP10G A (VISH) A
6772	933117810133	DIO REG BZX79-C12 A (PHSE) A
7301	935266857112	IC TDA4886/V2 (PHSE) L
7302	935270542112	IC TDA4823PS/V1 (PHSE) L
7303	932210611676	IC LE33CZ (ST00) A
7304	932218565682	IC NT68275-00031 (NOVA) L
7721	932214469676	TRA SIG BF422 (KEC0) A
7722	932214469676	TRA SIG BF422 (KEC0) A
7731	932214469676	TRA SIG BF422 (KEC0) A
7732	932214469676	TRA SIG BF422 (KEC0) A
7751	932214469676	TRA SIG BF422 (KEC0) A
7752	932214469676	TRA SIG BF422 (KEC0) A
7761	932209011673	TRA SIG BC548C (KEC0) A

MHR ASSY (313817863681) 109B

2191	202055790151	CER2 DC B 500V S 1N PM10 A
2192	203803521502	ELCAP GS 50V S 22U PM20 A
2193	203803521603	ELCAP GS 63V S 22U PM20 A
2194	203803521209	ELCAP GS 16V S 220U PM20 A
2195	203830250166	CAP MPOL 400V S 10N PM10 A
3191	212211000372	RST MFLM MF1/2WS A 3K9 PM1 A
3192	212211000378	RST MFLM MF1/2WS A 6K8 PM1 A
3402	213811273188	RST CRB CFR-25 A 1R8 PM5 A
5191	313818875671	FIL MAINS HARM 70MH 0A72
5192	243853598058	IND FXD BEAD EMI 100MHZ 80R A
6191	933256030673	DIO SIG 1N4148 A (VISH) A
6192	933189210133	DIO SIG BAV21 A (PHSE) A
6193	933189210133	DIO SIG BAV21 A (PHSE) A
6194	933256030673	DIO SIG 1N4148 A (VISH) A
7191	933953420676	TRA SIG TBC338-40 (TOSJ) A

C/B ASSY(313817865181)-109B5

3891	212211000385	RST MFLM MF1/2WS A 12K PM1 A
3892	212211000389	RST MFLM MF1/2WS A 18K PM1 A
3893	212211000401	RST MFLM MF1/2WS A 47K PM1 A
6891	932218424682	LED VS L-34GD (KIEL) B

Different Parts List

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Diversity V50 109B50/97 comparing with V50 109B501/00		
1053	313818878181	MAINSCORD ASTA 10A 1M83 GY
Diversity V50 109B50/75 comparing with V50 109B501/00		
1151	930193010323	CRT M46QEF903X01(H)S (LGPD) B
1151	930194110323	CRT M46QEF903X01(H)SM (LGPD) B
1151	823827444491	M46QCK761X123(TCO/MDT/-500MG)
1151	823827445121	CRT M46AJS53X76 R (MV)
1053	313818878171	MAINSCORD AUS/NZ 10A 1M83 GY
Diversity V50 109B50/74 comparing with V50 109B501/00		
0201	313811578271	RATING LABEL
0450	313810662501	CARTON
1053	313812876071	MAINSCORD UL 10A 1M8 DET GY
1053	313818870481	MAINSCORD UL 10A 1M8 DET TDS
Diversity V50 109B50/89 comparing with V50 109B501/00		
1152	313817866111	MB-1 ASSY (LG)450V
1152	313817866121	MB-2 ASSY (SDI)450V
1152	313817866131	MB-3 ASSY (CPTI)450V
0450	313810662511	CARTON
0213	313811577901	LABEL-EEPROM(SDI)
2632	202055890561	CERHDT RR 2KV S 220P PM10 A
2632	225271214216	CERHDT F-Y5R 2KV S 220P PM10 A
3407	212211000303	RST MFLM MF1/2WS A 2R PM1 A
3407	231291512008	RST MFLM MBB0207 A 2R PM1 A
3407	212211600293	RST MFLM MF0207 A 2R PM1 A
3503	212211000389	RST MFLM MF1/2WS A 18K PM1 A
3503	231291511803	RST MFLM MBB0207 A 18K PM1 A
3503	212211600363	RST MFLM MF0207 A 18K PM1 A
3505	213810113683	RST CRB CFR-12 A 68K PM5 A
3508	232224182704	RST MGL VR25 A 270K PM1 A
3508	213810500429	RST MGL RMU14 A 270K PM1 A
3558	232224181804	RST MGL VR25 A 180K PM1 A
3558	213810500426	RST MGL RMU14 A 180K PM1 A
0213	313811577911	LABEL-EEPROM(CPT)
2632	202055890561	CERHDT RR 2KV S 220P PM10 A
2632	225271214216	CERHDT F-Y5R 2KV S 220P PM10 A
3407	212211000303	RST MFLM MF1/2WS A 2R PM1 A
3407	231291512008	RST MFLM MBB0207 A 2R PM1 A
3407	212211600293	RST MFLM MF0207 A 2R PM1 A
3503	212211000381	RST MFLM MF1/2WS A 8K2 PM1 A
3503	231291518202	RST MFLM MBB0207 A 8K2 PM1 A
3503	212211600357	RST MFLM MF0207 A 8K2 PM1 A
3505	213810113473	RST CRB CFR-12 A 47K PM5 A
3508	232224183304	RST MGL VR25 A 330K PM1 A
3508	213810500431	RST MGL RMU14 A 330K PM1 A
3558	232224181504	RST MGL VR25 A 150K PM1 A
3558	213810500425	RST MGL RMU14 A 150K PM1 A
1053	313818877651	MAINSCORD CHIN 10A 1M83 DET GY
2106	203803524009	ELCAP LP 450V S 150U PM20 B
2106	202202000844	ELCAP GM 450V S 150U PM20 B

Diversity V50 109B55/74 comparing with V50 109B501/00		
1152	313817866141	MB-1 ASSY(LG)-BLK
1152	313817866151	MB-2 ASSY (SDI)-BLK
1152	313817866161	MB-3 ASSY(CPT)-BLK
1173	313813978631	BB MAINS CORD(BLK 1.8M USA)
0001	313812754061	FRONT CABINET ASSY - BLK
0004	313812754071	CHIN ASSY-BLK
0042	313810461141	BACK COVER-BLK
0003	313812754001	PEDESTAL ASSY (BLK)
0201	313811578291	RATING LABEL-BLK
0450	313810662521	CARTON (TCO99)
0851	313810979441	CFB(109B5-BLK)
0213	313811577901	LABEL-EEPROM(SDI)
2632	202055890561	CERHDT RR 2KV S 220P PM10 A
2632	225271214216	CERHDT F-Y5R 2KV S 220P PM10 A
3407	212211000303	RST MFLM MF1/2WS A 2R PM1 A
3407	231291512008	RST MFLM MBB0207 A 2R PM1 A
3407	212211600293	RST MFLM MF0207 A 2R PM1 A
3503	212211000389	RST MFLM MF1/2WS A 18K PM1 A
3503	231291511803	RST MFLM MBB0207 A 18K PM1 A
3503	212211600363	RST MFLM MF0207 A 18K PM1 A
3505	213810113683	RST CRB CFR-12 A 68K PM5 A
3508	232224182704	RST MGL VR25 A 270K PM1 A
3508	213810500429	RST MGL RMU14 A 270K PM1 A
3558	232224181804	RST MGL VR25 A 180K PM1 A
3558	213810500426	RST MGL RMU14 A 180K PM1 A
0213	313811577911	LABEL-EEPROM(CPT)
2632	202055890561	CERHDT RR 2KV S 220P PM10 A
2632	225271214216	CERHDT F-Y5R 2KV S 220P PM10 A
3407	212211000303	RST MFLM MF1/2WS A 2R PM1 A
3407	231291512008	RST MFLM MBB0207 A 2R PM1 A
3407	212211600293	RST MFLM MF0207 A 2R PM1 A
3503	212211000381	RST MFLM MF1/2WS A 8K2 PM1 A
3503	231291518202	RST MFLM MBB0207 A 8K2 PM1 A
3503	212211600357	RST MFLM MF0207 A 8K2 PM1 A
3505	213810113473	RST CRB CFR-12 A 47K PM5 A
3508	232224183304	RST MGL VR25 A 330K PM1 A
3508	213810500431	RST MGL RMU14 A 330K PM1 A
3558	232224181504	RST MGL VR25 A 150K PM1 A
3558	213810500425	RST MGL RMU14 A 150K PM1 A
1053	313812874901	MAINSCORD
1053	313818870491	MAINSCORD UL 10A 1M8 DET BK
0041	313810461111	FRONT CABINET - BLK
0045	313810461121	CHIN-BLK
0049	313810461131	FUNCTION BUTTON-BLK
0044	313810460281	BASE
0053	313810460981	SWIVEL (BLK)
1054	313818878351	CORD SUB-D 15/1M8/13 UL BK

Repair Flow Chart

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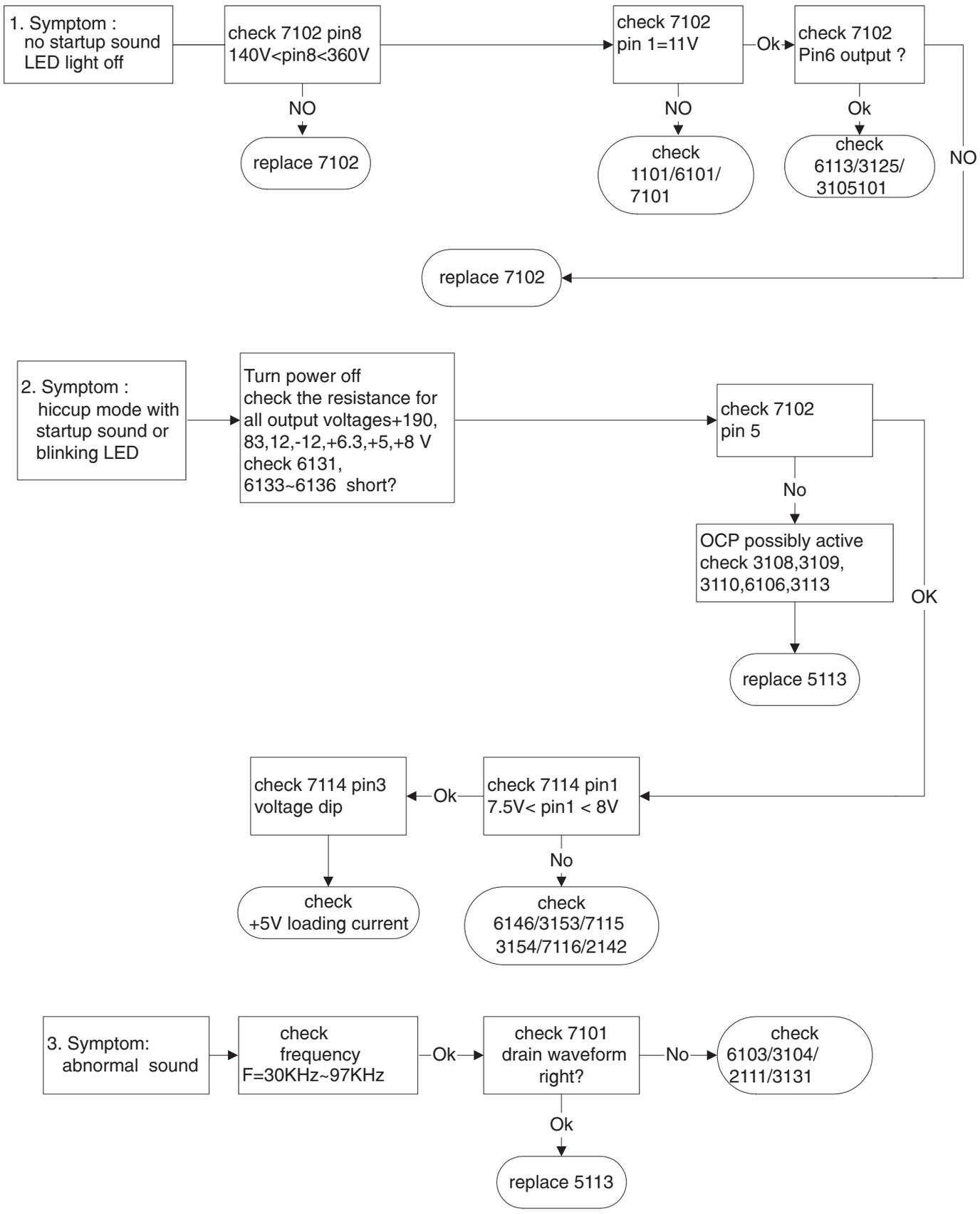
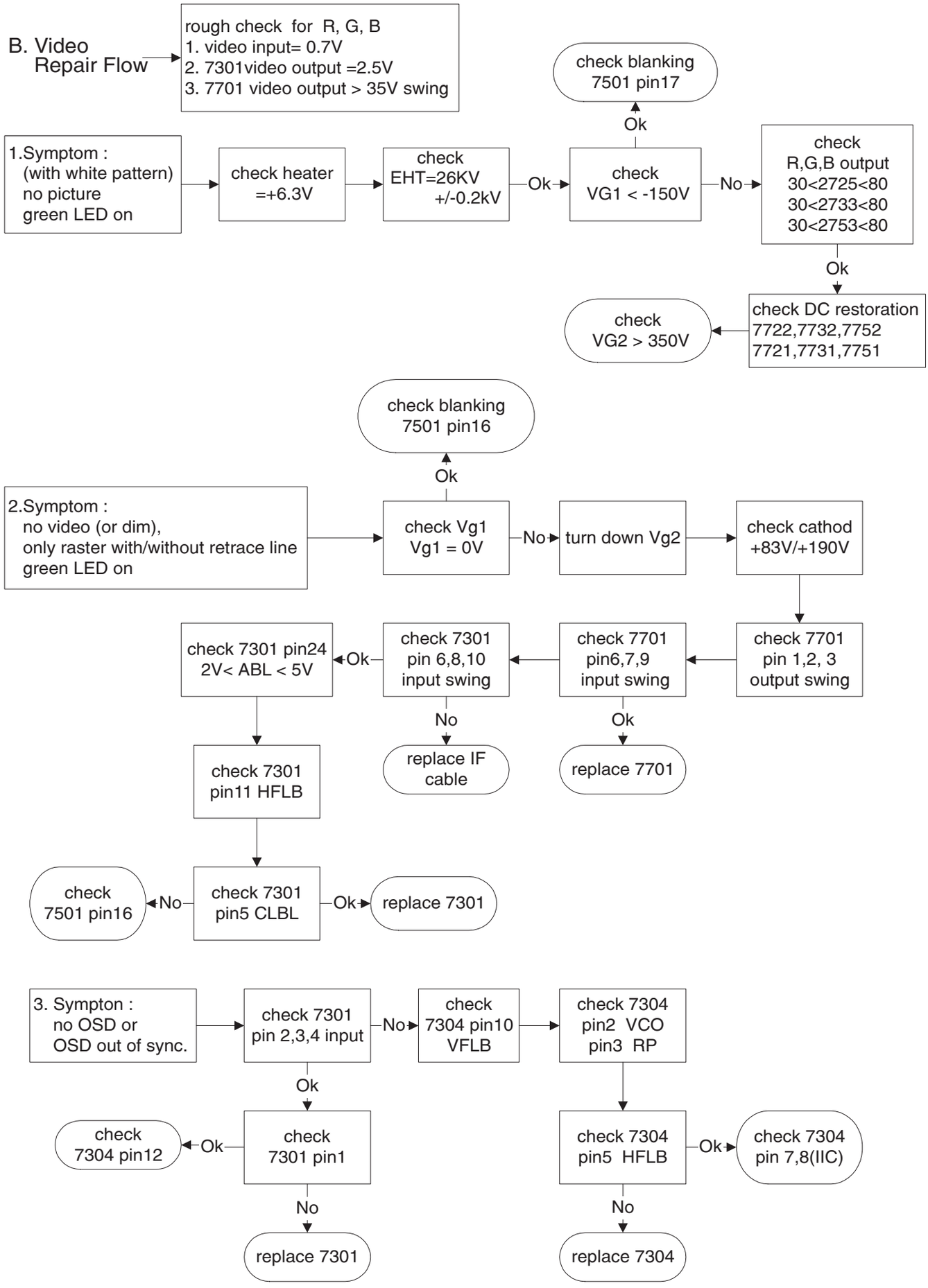
A. Power Supply Failure

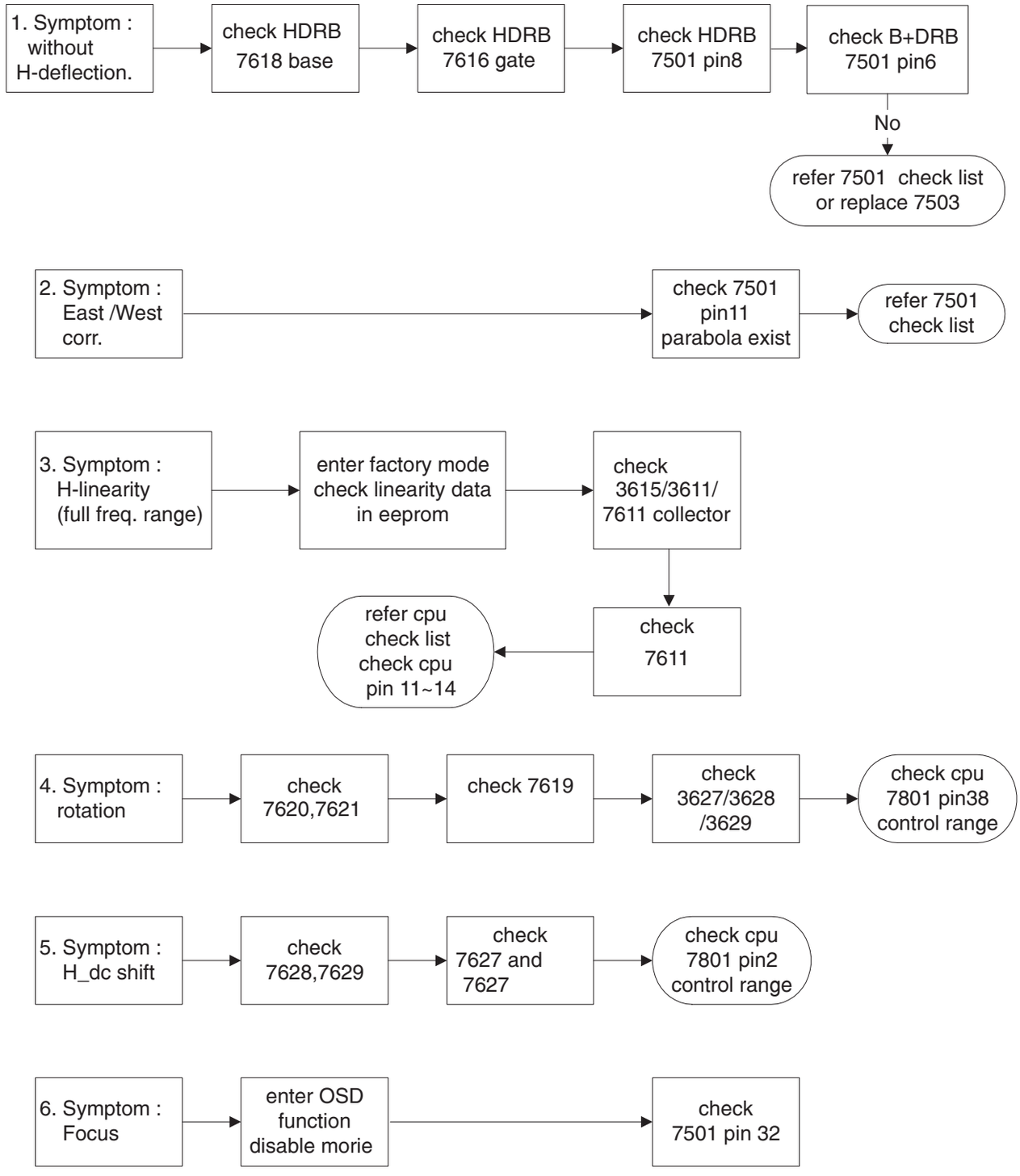


Repair Flow Chart (Continued)



Repair Flow Chart (Continued)

C. Horizontal deflection
output repair flow :



Repair Flow Chart (Continued)

D. Vertical Deflection Failure → basic check +12/-12V

Symptom :
one horizontal line
V_size is abnormal
too large/small

→ check 7501 pin 12, 13

No → replace 7501

Ok → check 7401 pin1,pin7 ramp exist ?

No → check 3554,3552

Repair Flow Chart (Continued)

E. CPU check list → 1. Basic Check → check cpu pin 6/pin 5=5V pin 8/pin 9=12MhZ

4. H-linearity → check pin 4 pwm from 0V to 5V

2. H-Centering → check pin2 pwm from 0V to 5V

19. Blank → check pin19 normal : low change timing : Hi

14~10 (Q5,Q4, Q3, Q2,Q1) S-cap switch → check Q1-Q5 low : 0 hi :1

109B5 S-CAPACITOR SWITCH TABLE

Hor. Freq.(KHz)	Q5	Q4	Q3	Q2	Q1
~33.24	0	0	0	0	0
33.24~36.51	0	0	1	1	1
36.51~40.60	0	1	1	0	0
40.60~45.07	1	0	0	0	0
45.07~47.62	1	0	0	1	1
47.62~51.49	1	0	1	1	0
51.49~55.07	1	0	1	1	1
55.07~61.96	1	1	0	0	0
61.96~66.29	1	1	0	1	0
66.29~74.32	1	1	0	1	1
74.32~82.96	1	1	1	0	1
82.96~89.00	1	1	1	1	0
89.00~0xffff	1	1	1	1	1

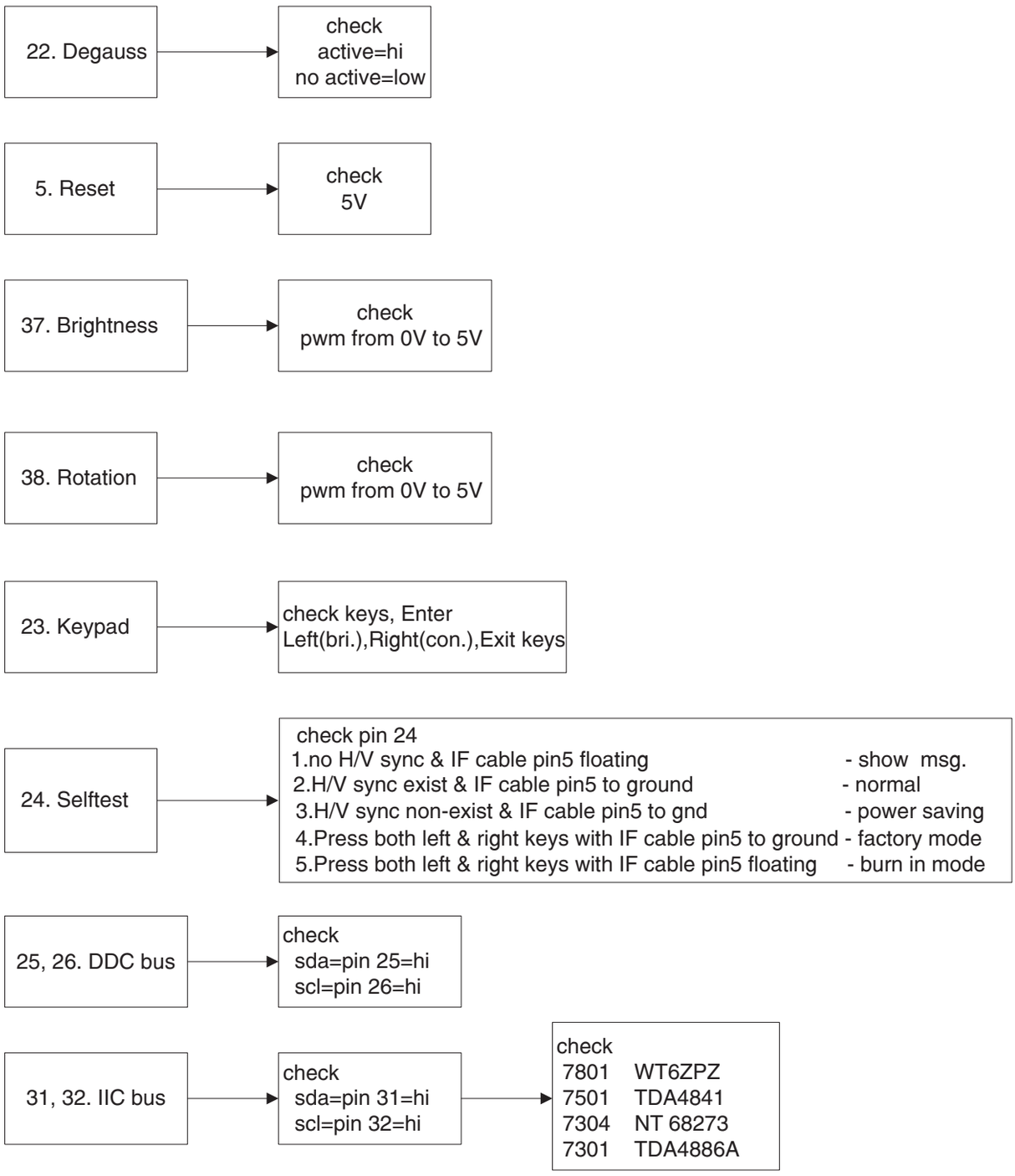
3. ABL-Adj → check pin 3 pwm from 0V to 5V

18. Hunlock → check pin18 normal=Hi blank=low

20,27 P.S. LED → check pin20/27 →

	pin27	pin20
normal	hi	hi
off	low	hi

Repair Flow Chart (Continued)



Repair Flow Chart (Continued)

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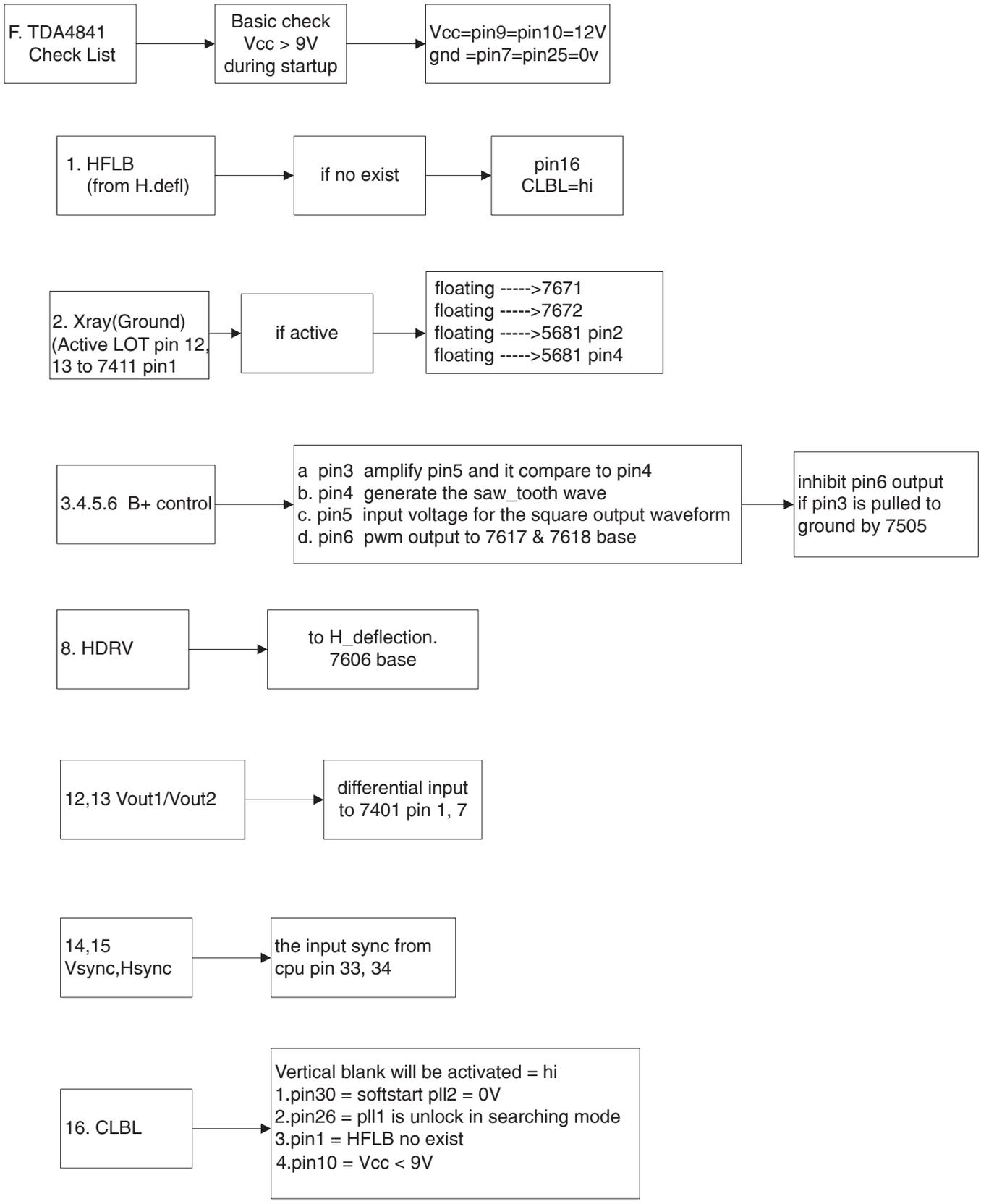
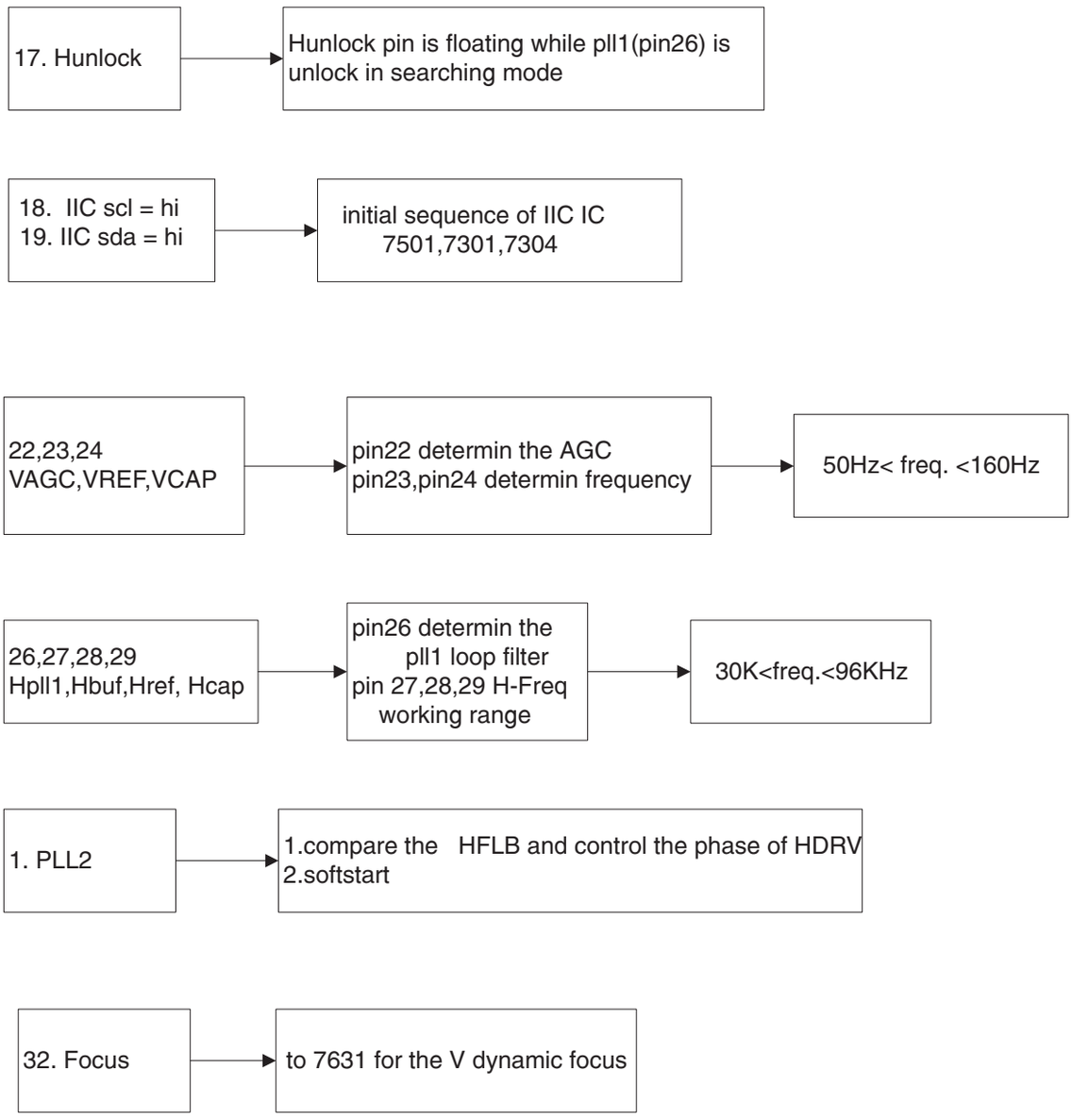


Repair Flow Chart (Continued)



PHILIPS

V50 109B5 HB 19" General Specification (Sheet 590)

FEATURES / BENEFITS

- Extremely high MTBF (over 75K Hours, exclude. CRT).

- User friendly OSD display for mode identification and adjustment

- Professional look, with non-flammable cabinet (94V-0).

- Better display performance.
  . Flat/square display tube
  . Finer CRT dot pitch (0.25 mm)
  . Full screen size application
  . Real multi-freq.

- Power saving management system.

- VESA DDC2B

- Picture tilt control

- Low emission TCO99 / TCO 03

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GENERAL PRODUCT SPECIFICATION(Continued)

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CLASS NO.	V50-19" 109B5 97KHz(HB)						
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS	8639 000 14291					
NAME C.C.LIAO	SUPERS.	25	590 — 3	10		A4	
TY CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

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1.0 Introduction

This document is related to the 19" AUTOSCAN color monitor and max. resolut ion:
1920 X 1440 by 60HZ refresh rate

2.0 General description

This AUTOSCAN analog colour monitor is specified as a display peripheral within an IBM compatible PC.

The AUTOSCAN a nalog colour monitor is to operate at H: 30 to 97 KHz V: 50 to 160 Hz can be applied to all RGB analog computers within this scanning frequencies.

The AUTOSCAN analog colour monitor is intended to be a fin ished product, basically a display device mounted inside a plastic enclosure which provides the aesthetic, mechanical, ergonomic and safety requirements.

2.1 General condition

The unit will produce a usable ima ge after switching-on, measurements are to be carried out with a full stabilised set after about 30 minutes warm -up at room ambient temp. of 25 C.
Repetitive power on/off cycles are al lowed though should be avoided within 4 sec.

3.0 Electrical characteristics

3.1 Signal interface

This AUTOSCAN analog colour display has an analog video interface to operates at a multi-frequencies timing in several display modes.

3.1.1 Input requirements

A. Input signals
Video - 0.7Vp-p 75 ohms (for individual of R,G and B signals must not devia te 0.015Vp-p from each other for balance of white pattern)

Sync - TTL level
(between 0 and 0.6 V to be considered as low level, between 2.3 and 5.0 V as high level)

B. Impedance
Video - Terminated with 75 ohms
Sync - Terminated with 4.7K ohms pull-down resistors.

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3.1.2 Signals input

The input video signals are applied to the display device through a video cable which is fixed to the monitor (flying cable length 1.8M).

Video input cable:
15 pin D-Sub connector type with pin assignment as follows:

Pin assignment of 15P D-SUB connector

Pin No.	Assignment
P 1	Red video input
P 2	Green video input
P 3	Blue video input
P 4	Ground
P 5	Self-test
P 6	Red video ground
P 7	Green video ground
P 8	Blue video ground
P 9	Not connect
P10	Ground
P11	Ground
P12	Bi-directional data (SDA)
P13	H SYNC
P14	V SYNC
P15	DDC Data CLOCK (SCL)

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3.1.3 Factory pre-set modes:

Factory modes : 33

User modes : 16

Item	Resolution	Freq. V x H	Pixel rate(Mhz)	Remark
1	640x480	60(31.469k)	25.175	VGA
2		72.8(37.861k)	31.500	VESA
3		75(37.500k)	31.500	VESA
4		85(43.269k)	36.000	VESA
5		100.1(50.60k)	40.500	SNI
6	720x400	70(31.469k)	28.321	VGA
7		85(37.927k)	35.500	VESA
8	800x600	60.3(37.879k)	40.000	VESA
9		72.12(48.077k)	50.000	VESA
10		75(46.875k)	49.500	VESA
@ 11		85(53.674k)	56.250	VESA
12		100.1(63.90k)	67.500	SNI
13	832x624	74.6(49.725k)	57.280	MAC
14	1024x768	60(48.363k)	65.000	VESA
15		70(56.476k)	75.000	VESA
@ 16		75(60.000k)	78.750	VESA
@ 17		84.997(68.677k)	94.500	VESA
18	1152x864	75(67.500k)	108.000	VESA
@ 19		85(77.100k)	121.500	VESA/P
20	1152x870	75(68.681k)	100.000	MAC
21	1152x900	76(71.800k)	108.000	SUN
22	1280x960	60(60.000k)	108.000	VESA
23		85(85.938k)	148.500	VESA
24	1280x1024	60(63.981k)	108.000	VESA
@ 25		75(79.976k)	135.000	VESA
26		85(91.146k)	157.500	VESA
27	1600x1200	60(75.000k)	162.000	VESA
28		65(81.250k)	175.500	VESA
29		70(87.500k)	189.000	VESA
@ 30		75(93.750k)	202.500	VESA
31	1792x1344	60(83.640k)	204.750	VESA/P
32	1856x1392	60(86.333k)	218.250	VESA/P
@ 33	1920x1440	60(90.000k)	234.000	VESA/P

@ denote it is a main preset timing

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3 .2 Timing requirements

The main timing table (1 8) are shown as below

TIMING FOR V50-109B5 AUTOSCAN COLOR MONITOR

REFERENCE PATTERN GENERATOR: CHROMA 2250

TABLE 1: 53.674KHz/85.061Hz, 800 X 600, pixel=56.250MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	18.631 us	Total size	=	11.756 ms
Display size	=	14.222 us	Display size	=	11.179 ms
Rear porch	=	2.702 us	Rear porch	=	0.503 ms
Sync width	=	1.138 us	Sync width	=	0.056 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 2: 60.023KHz/75.029Hz, 1024 X 768, pixel=78.750MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	16.660 us	Total size	=	13.328 ms
Display size	=	13.003 us	Display size	=	12.795 ms
Rear porch	=	2.235 us	Rear porch	=	0.466 ms
Sync width	=	1.219 us	Sync width	=	0.050 ms
Sync. polarity	=	+	Sync. polarity	=	+

TABLE 3: 68.677KHz/84.997Hz, 1024 X 768, pixel=94.500 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	14.561 us	Total size	=	11.765 ms
Display size	=	10.836 us	Display size	=	11.183 ms
Rear porch	=	2.201 us	Rear porch	=	0.524 ms
Sync width	=	1.016 us	Sync width	=	0.044 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 4: 77.094KHz/84.999Hz, 1152 X 864, pixel=121.500 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	12.971 us	Total size	=	11.765 ms
Display size	=	9.481 us	Display size	=	11.207 ms

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TABLE 5: 79.976KHz/75.025Hz, 1280 X 1024, pixel=135.00MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	12.504 us	Total size	=	13.329 ms
Display size	=	9.481 us	Display size	=	12.804 ms
Rear porch	=	1.837 us	Rear porch	=	0.475 ms
Sync width	=	1.067 us	Sync width	=	0.038 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 6: 90.000 KHz/60.000Hz, 1920 X 1440, pixel=234.000 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	11.111 µs	Total size	=	16.667 ms
Display size	=	8.205 µs	Display size	=	16.000 ms
Rear porch	=	1.470 µs	Rear porch	=	0.622 ms
Sync width	=	0.889 µs	Sync width	=	0.033 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 7: 91.146 KHz/85.024Hz, 1280 X 1024, pixel=157.500 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	10.971 µs	Total size	=	11.761 ms
Display size	=	8.127 µs	Display size	=	11.234 ms
Rear porch	=	1.422 µs	Rear porch	=	0.483 ms
Sync width	=	1.016 µs	Sync width	=	0.033 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 8: 93.750 KHz/75.000Hz, 1600 X 1200, pixel=202.500 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	10.667 µs	Total size	=	13.334 ms
Display size	=	7.901 µs	Display size	=	12.800 ms
Rear porch	=	1.501 µs	Rear porch	=	0.491 ms
Sync width	=	0.948 µs	Sync width	=	0.032 ms
Sync polarity	=	+	Sync polarity	=	+

3.2.1 Horizontal scanning

Scanning frequency : 30 - 97 KHz,
H-shift range : 10 mm min.

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GENERAL PRODUCT SPECIFICATION(Continued)

3.2.2 Vertical scanning

Scanning frequency: 50 - 160 Hz
V-shift range : 8 mm Min.

3.3 Power supply

The display device maintains the specified performance in the range described as below:

Type	Mains current	Mains Voltage	Mains freq.
	1.6A max.	90 - 264 VAC	47-63Hz

Power consumption : 100W Max. / 75W (typical).
Power cord length : 1.5M
Power cord type : 3 leads detachable power cord with protective earth plug .

3.4 Power saving management system

MODE	SIGNAL			POWER	RECOVERY TIME
	H-SYNC	V-SYNC	VIDEO		
ON	ACTIVE	ACTIVE	ACTIVE	< 75W (typical)	NA
OFF	INACTIVE	ACTIVE	BLANKED	< 2W	~ 7 SEC.
OFF	ACTIVE	INACTIVE	BLANKED	< 2W	~ 7 SEC.
OFF	INACTIVE	INACTIVE	BLANKED	< 2W	~ 7 SEC

3.5 CRT Description

This display unit employs a high resolution CRT complying with the following specifications :

Dimensions : 19 inches
Flat Faceplate Square Shadow Mask.
Diagonal VIS : 18 inches
Pitch : 0.25mm dotted
Horizontal pitch : 0.21mm
Deflection angle : 90 degrees
Light transmission : 53% (CPT) / SDI (52.6%) / 45% (LG) / High Brightness
Face treatment : AR-ASC (CPT), AR Filming (SDI), AR-AS (LG) coating
Phosphors : P22
EHT : 26.0KV
Visible screen area : 360 mm x 270 mm
Magnetic field : North / South

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3.6 RGB Amplifier

3.6.1 Video amplifiers

Dot Rate	: 202.5 MHz
Rise/fall time	: 5 / 6 ns
Over / undershoot	: 15% Max. (Transient response)
Sag (background uniformity)	: 5% Max. (pulses of 0.70H)

3.6.2 Brightness and contrast

Reference mode 68.7K/85Hz full white pattern / small window pattern(Fig 5).

Brightness	Contrast	Light output (full white)	Light output (small window)
Minimum	Minimum	< 0.5 FL	
Center	Maximum	30 +3/-5 FL	41 +4/-5 FL

3.6.3 sRGB: When sRGB is selected, the light output (Full white pattern) will be 23 3 FL regardless of contrast and brightness controls. Adjusting contrast or brightness will auto exit sRGB setting and go to 6500K.

3.7 Variation of image size after warm-up 30 minutes

Due to brightness change from 3 to 30 FL (Max.)	: < 1.0 %
Due to aging (0 to 40 C)	: < 1.0 %
Due to mains voltage variation	: < 1.0 %

3.8 Degaussing

An automatic degaussing circuit is provided which requires no intervention. The degaussing activated at the time of switch-on or switch-on again or pressing manual degaussing key after switching-off degaussing circuits for longer than 30 minutes.

3.9 Phosphor protection

The display device is sufficiently protected against the burning of phosphors in case of repetitive power cycling or absence of horizontal deflection.

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GENERAL PRODUCT SPECIFICATION(Continued)

3.10 Low emission requirements (TCO99 / TCO 03)

Items	Band I ELF (rms)	Band II VLF (rms)
Alternating Electric Field	MPR-II ≤ 25 V/M TCO-99/03≤10	MPR-II ≤ 2.5V/M TCO-99/03≤1.0
Magnetic Field	MPR-II ≤ 250 nT TCO-99/03≤ 200 nT	MPR-II ≤ 25 nT TCO-99/03≤25 nT
E.S.P	≤ ± 500 V	

Band I : 5 to 2K Hz.
Band II : 2K to 400K Hz.
Test procedure according to Low emission test method.

3.11 Display data channel : DDC2B (VESA STANDARD)

The software DDC HEX Data should be written into the EEPROM A0 page.

	DDC1	DDC2B
Software		V
Hardware		

4.0 Display image (CRT facing east)

The monitor is aligned in a magnetic cage having the following magnetic field components :

Northern Hemisphere : H = 0, V = +0.43 0.05G, Z = 0

Southern Hemisphere : H = 0, V = -0.52 0.05G, Z = 0

Conditions for visual testing, unless otherwise stated:

Input video signal - 700 mVp-p cross hatch
Brightness control - 50%
Contrast control - Adjusted to 30 3 FL of luminance with full white pattern

4.1 Display resolutions

See 3.1.3

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4.2 Image size (Factory pre-set modes only)

The dimensions of guaranteed display area to be measured along the picture center of horizontal and vertical axis of the screen as listed below: (preset modes only, refer to Fig-1)

Width : 355 +/- 4 mm .(Fig-1)

Height : 265 +/- 4 mm .(Fig-1)

4.3 Image centering deviation (Factory main preset modes only)

With respect to Fig-2, the target relationships are the following :

$|A - B| <= 6$ mm $|C - D| <= 6$ mm

Note : This centering is adjustable by the end-user.

4.4 Picture shift control range

H-shift range : 10 mm min. (+/- 3mm,from center to each side)
V-shift range : 8 mm min. (+/- 2mm,from center to each side)

4.5 Picture tilt

With respect to Fig-3, Tilt to be measured on extremes of center line from bezel.

Tilt : < = 2 mm

4.6 Geometric distortions

It is acceptable that pincushion, trapezoid, rhomboid, rotation and various waves distortions must remain within the limits of tolerance as in fig. 4,

A , B	2.0mm
C , D	2.0mm
A + B C + D	3.5mm 3.5mm

The waviness of any vertical or horizontal shall be less than 1.0 mm over a 50 mm distance.

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GENERAL PRODUCT SPECIFICATION(Continued)

4.7 Horizontal / Vertical linearity:

12 equal blocks along horizontal axis,
9 equal blocks along vertical axis. (see Fig-1)

	30 -- 31.5kHz	31.6 64kHz	>64kHz
Horizontal non-linearity:	≤ 8 %	≤ 7 %	≤ 6 %
Vertical non-linearity:	≤ 8 %	≤ 7 %,	≤ 6 %
Horizontal two adjacent:	≤ 6 %	≤ 5 %	≤ 4 %
Vertical two adjacent:	≤ 6 %	≤ 5 %,	≤ 4 %

$$\text{H. linearity} = \frac{\text{Xmax. - Xmin}}{\text{X max. + Xmin.}} \times 100\%$$

$$\text{V. linearity} = \frac{\text{Ymax. - Ymin}}{\text{Ymax. + Ymin.}} \times 100\%$$

4.8 Mis-convergence

The maximum convergence error to be measured on a white spot or white display line to represents the maximum distance between the energy centers of any two primary colors. (See Fig. 6)
Mis-Convergence SPEC.
Zone A / C is 0.3 / 0.4 When ? 45kHz.

CRT Pitch	0.25mm
Zone A	0.25
Zone C	0.35
Center	0.15

4.9 Focus check (with 79.976KHz/75.025Hz, 1280 x 1024 mode)

Generate 9-blocks ME character pattern (Fig-7) to cover entire of the picture area 90mm x 90mm (display size respect to Fig-1), adjust brightness control to 50% and contrast at 100%, the ME character should be clearly identified in all display area.

4.10 Luminance uniformity

condition : With full white pattern, set contrast control at max. and adjust brightness control to get 30FL in center..

the max. deviation to the rest of the screen shall not exceed 25%

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4.11 White color adjustment

Based on the 1931 CIE chromaticity (colour triangle) diagram (x, y coordination).
coordination of white display on screen center should be:

for 9300 degree K	X	= 0.283	+/- 0.015
	Y	= 0.297	+/- 0.015
for 6500 degree K	X	= 0.313	+/- 0.015
	Y	= 0.329	+/- 0.015
for 5500 degree K	X	= 0.332	+/- 0.015
	Y	= 0.347	+/- 0.015
for sRGB degree K	X	= 0.313	+/- 0.015
	Y	= 0.329	+/- 0.015

Check conditions :
Set brightness control at 50% position and contrast at maximum.
sRGB luminance (Full white pattern): at 68.67K/85Hz, regardless of brightness 50% and
contrast controls: 23 3FL.

4.12 Color tracking on full white pattern

Ref. to white balance alignment result and set brightness at 50%, adjust contrast control from 5FL to max. position, the colour coordinate should not deviate more than following tolerance when compare to display center:

X= X nominal +/- 0.015
Y= Y nominal +/- 0.015

4.13 Purity
Test patterns : Full White / Red / Green / Blue.
Conditions: As stated in item 4.0, the purity must be checked under specific destinations of earth magnetic environments and the monitor to be well degaussed.
After warming-up time of 30 min., no coloured stains may occur in above four patterns.

4.14 Moire
Condition: Displaying a **full white pattern**, at any pre-set mode the display size of the sets to be set as stated in "Fig. 1".
Moire area should be less than 1/3 area @15FL via moire control.
However the OSD moire data of V-moire should have a default value (mode dependent) for product outgoing .Increasing the moire control value will have side effect on resolution (degrade focus),and phenomenon of flicker and sawtooth.

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5.0 **Mechanical characteristics**

5.1 User controls (at front) left to right

Contrast tact switch control
(With Decrease and Increase)

Brightness tact switch control
(With Decrease and Increase)

OSD Ok / menu tact switch control

Power on/off button tact switch control

6 .0 Connectors and cables

6.1.1 Power cord (plugable) type : Wall Plug ,non shielded and non-attached.

Length : 1.8 m +/- 50 mm . Plug curved at 90 .

6.1.2 Signal cable

Length of video : 1.8 m +/- 50 mm flying in 15pins D-sub.

7.0 Environmental characteristics

The following sections to define the interference and susceptibility condition limits that might occur between external environment and the display device.

7.1 Susceptibility of display to external environment

7.1.1 Operating limits

A). Temperature : 0°C to 40°C
Humidity : 10 to 90% (W/O condensation)
Air pressure : 10000 to 39000 ft

B). Non-operating limits (storage)
Temperature : -25°C to 65°C
Humidity : 5 to 95 % (W/O condensation)
Altitude : 10000 to 39000 ft

7.1.2 Transportation packages
A) Carton box (outside dimension)
: 526(W) x 476 (H) x 560 (D) mm.

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B) Transportation conditions

(see table, shown as below)

B-1 Transportation standards

TEST	Standard reference	Philips severity		Remarks
		Gross weight (Kg)	Drop height (cm)	
Drop 1C-3E-6F	NSTA	23.1	61	*W/O 10% drop height increment *Rear/Front
drop height:45cm				
Random vibration		Truck spectrum, 0.73 Grms, 30 min/axis, 3 axes		
Shock (Non-oper)		- 1/2 sine pulse: 100G<3ms, 6 shocks - Damage boundary curve: * CRT supplier spec. is used to define maximum acceptable CRT fragility.		Design stage only

B-2 Container loading

Q'ty	Container size					
	40Feet W/Pallet		20Feet W/Pallet		High cube 40 feet W/Pallet	
	Yes	No	Yes	No	Yes	No
Layers	5	5	5	5	5	5
Sets per layer	4	4	4	4	4	4
Sets per block	16	16	16	16	20	20
Blocks per container	22	22	10	10	22	22
Total set	352	352	160	160	440	440

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GENERAL PRODUCT SPECIFICATION(Continued)

7.2 Display disturbances from external environment

7.2.1 ESD Disturbances
According to IEC65 (also refer to IEC801-2 for detail).

7.3 Display disturbances to external environment

The disturbances induced by the display and tolerated by the environment are defined as follows:

7.3.1 Ionizetic radiation
Completely fulfilled International Commission of Radio logical Protection (ICRP) requirement 0.5 mr/hrs.
Actually the set can reach 0.1 mr/hrs.

7.3.2 Safety and EMI/EMS requirements

Safety	- USA	:UL 1950
	-CANADA	:CSA C22.2 NO.950-M89
	-NORDIC	:IEC950
		:EN60950
		:SEMKO TSE (74SEC) 207/94
	-EUROPE	:CE
	-Poland	:PCBC
	-Singapore	:PSB
	-Germany	:TUV
EMS	-EN61000-4-3(80% 1KHz AM modulation) picture jitter ? 4mm	
EMI	-USA	:FCC PART 15 Class B
	-CANADA	:D.O.C. Class B
	-CE	:EN55022 CLASS B
		:C-tick
Ergonomics		:E2000, EPA, MPRII, Nutek ISO 9241-3&8, 9241-7, TCO-99, TCO 03
Compatibility		: PC99, Windows 2000, Windows ME, PC2001 Windows XP.
LOW EMISSION		:TCO99 / TCO 03

7.3.3 X-RAY radiation requirement /regulation

-USA/CANADA :DHHS 21 CFR, CHAPTER 1,SUBCHAPTER J
-GERMANY :RONTGEN VERORDNUNG ROV 1987.01.08

X-ray explosure at 5cm distance from any point of the external surface must not exceed
0.1 mR/H.

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8.0 Reliability

8.1 Mean time between failures
MTBF to be calculated according to Military standard MIL-HDBK-217C.

MTBF >=75,000 Hours (Excluding CRT)

$$\text{PRACTICE of MTBF} = \frac{\text{TOTAL HRS (POWER ON) X TOTAL SETS}}{\text{NBR. OF FAILURED SETS}}$$

9.0 Quality assurance requirements

9.1 Acceptance test

According to MIL-STD-105D level II,
AQL : 0.65 (Major)
2.5 (Minor)

Customer acceptance :
criteria : UAW0377/00

Target Field repair rate : < 2 %

10.0 Serviceability

The service ability of this monitor should fulfill the requirements which are prescribed in UAW-0346 and must be checked with the check list UAT-0361.

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GENERAL PRODUCT SPECIFICATION(Continued)

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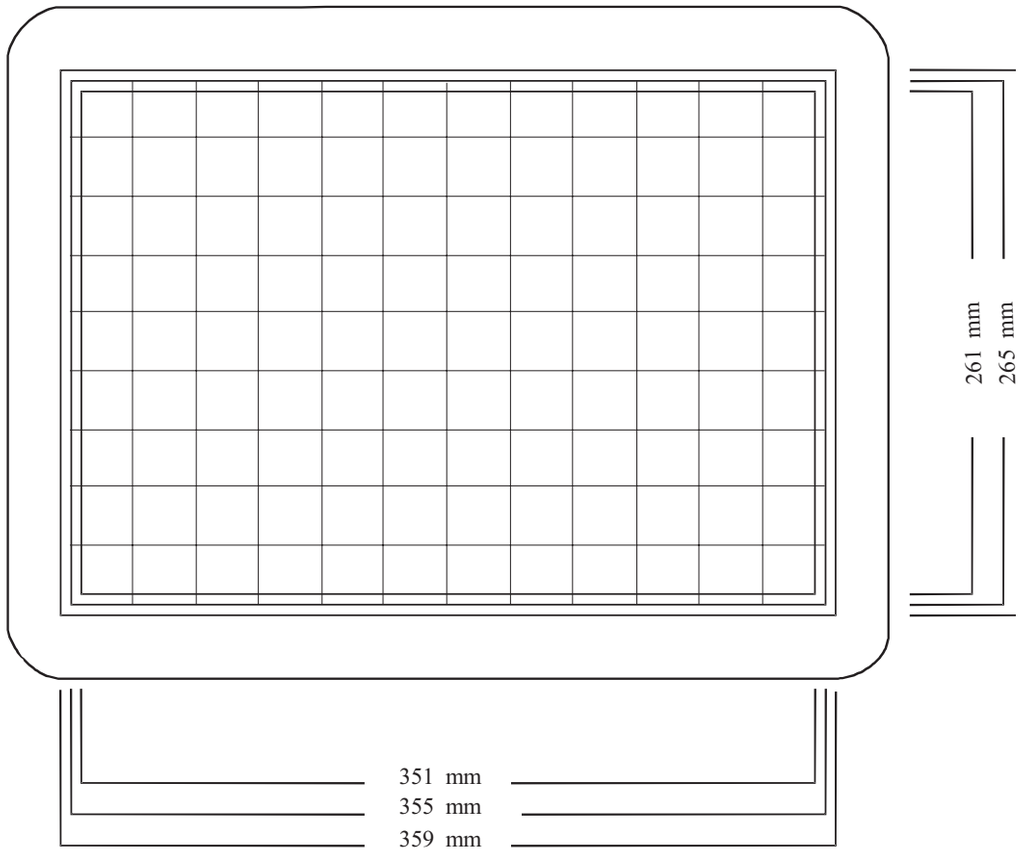

Fig-1 IMAGE DIMENSION

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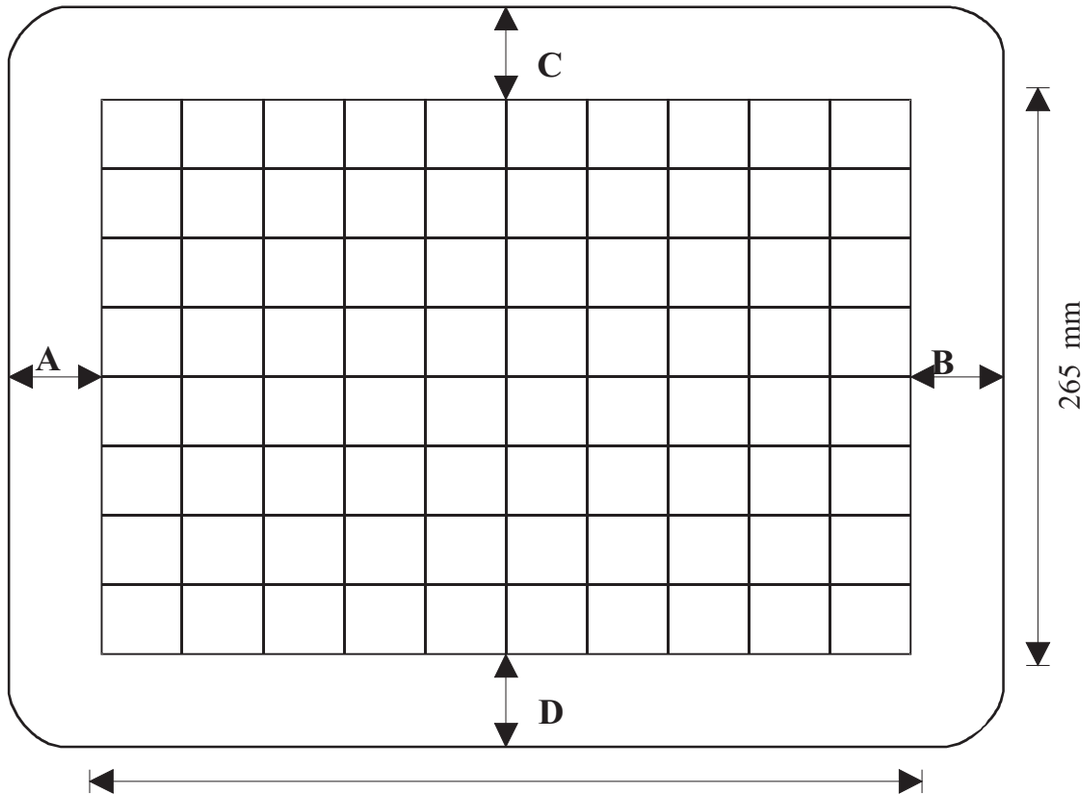

|A-B| AND |C-D| < 6 mm

FIG-2 IMAGE CENTERING

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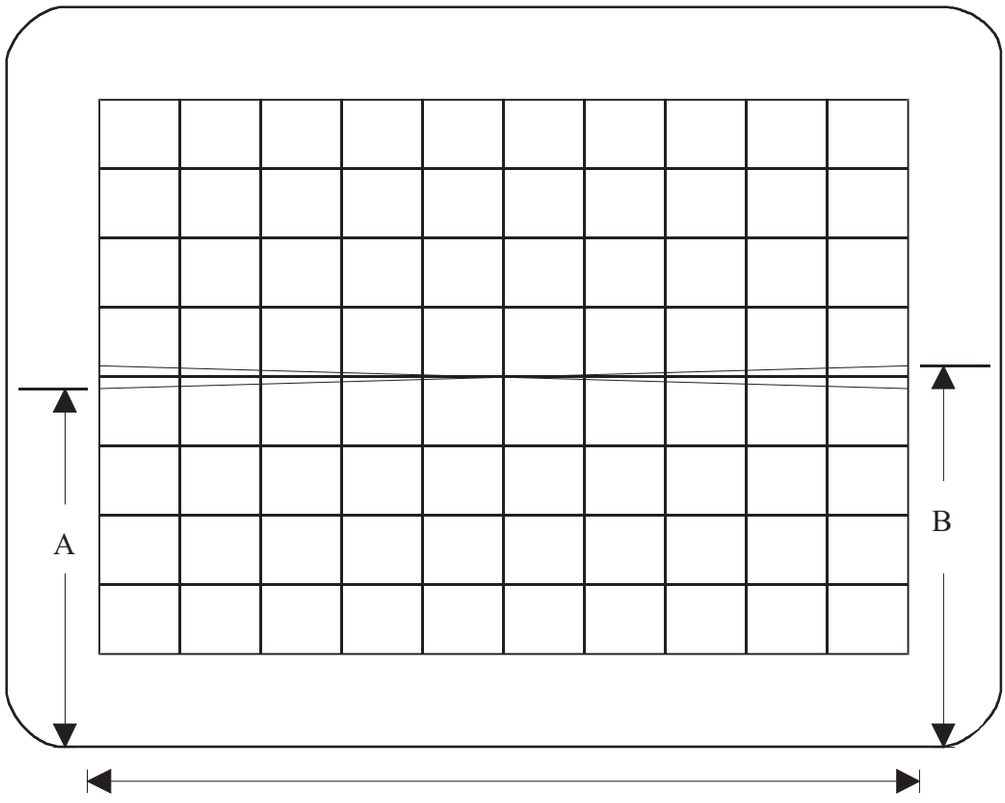
TY / CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.							

GENERAL PRODUCT SPECIFICATION(Continued)



|A-B| < 2 mm

FIG-3 IMAGE ROTATION

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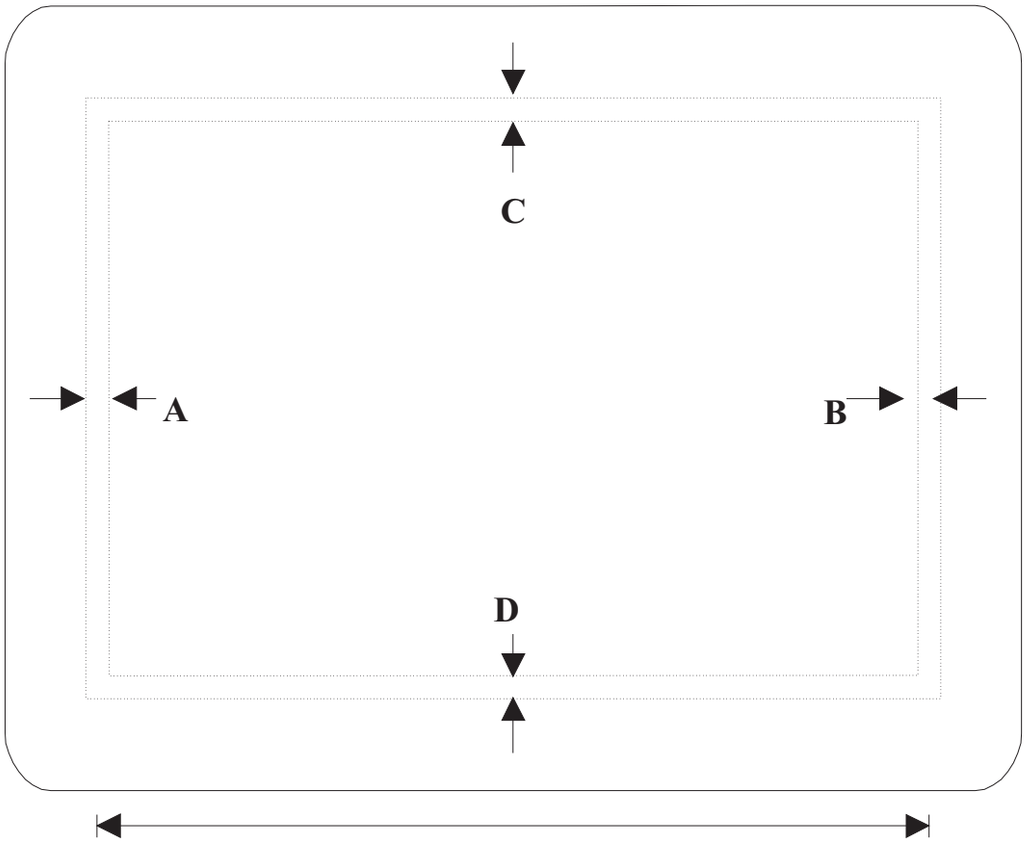
CLASS NO.	V50-19" 109B5 97KHz(HB)		8639 000 14291				
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS						
NAME C.C.LIAO	SUPERS.	25	590 — 21	10		A4	
TY / CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

PHILIPS



A, B < 2.0 mm C, D < 2.0 mm

FIG-4 IMAGE GEOMETRY

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CLASS NO.	V50-19" 109B5 97KHz(HB)								
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS			8639 000 14291					
NAME C.C.LIAO	SUPERS.	25	590 — 22	10		A4			
TY	CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.						

GENERAL PRODUCT SPECIFICATION(Continued)

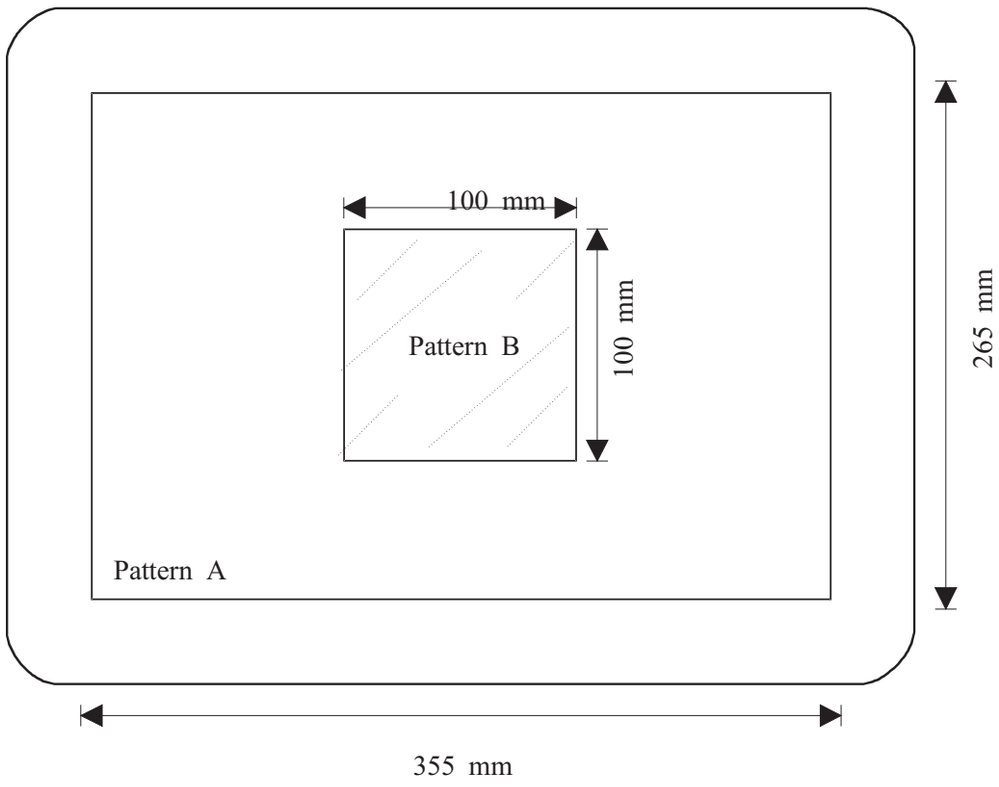

FIG-5 CONTRAST AND BRIGHTNESS MEASUREMENT PATTERNS

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CLASS NO.	V50-19" 109B5 97KHz(HB)						
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS	8639 000 14291					
NAME C.C.LIAO	SUPERS.	25	590 — 23	10		A4	
TY CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

PHILIPS

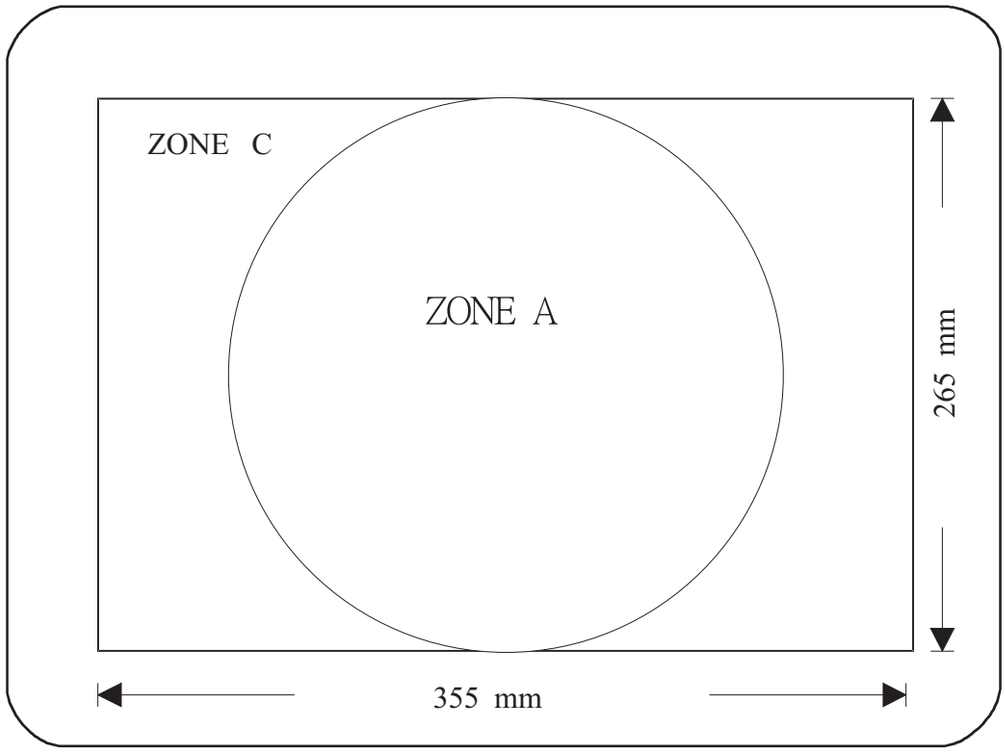

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FIG-6 MISCONVERGENCE MEASUREMENT AREA

CLASS NO.	V50-19" 109B5 97KHz(HB)								
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS			8639 000 14291					
NAME C.C.LIAO	SUPERS.	25	590 — 24	10	A4				
TY / CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.							

GENERAL PRODUCT SPECIFICATION(Continued)

PHILIPS

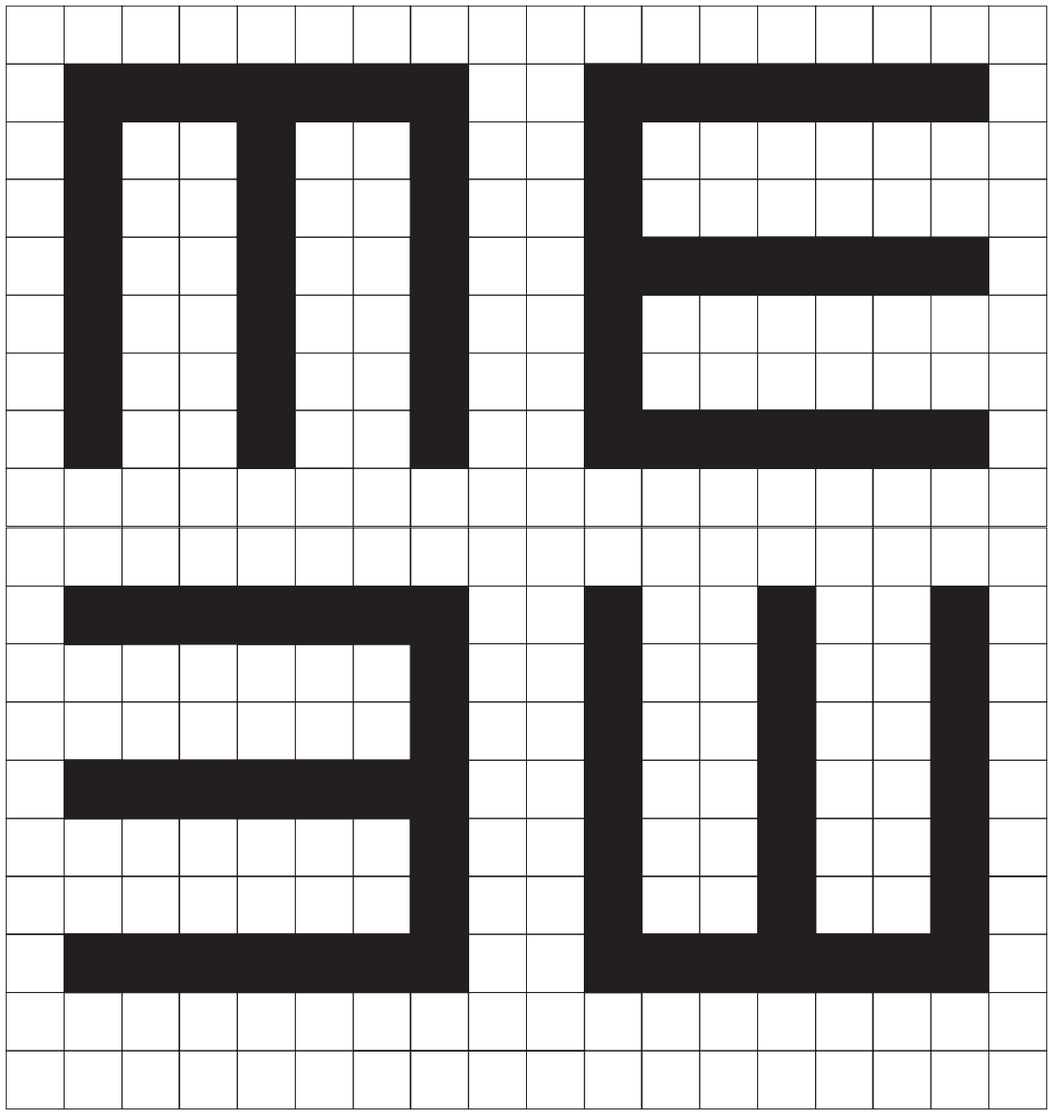

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FIG 6 SYMBOL FORMAT FOR FOCOS CHECK

CLASS NO.	V50-19" 109B5 97KHz(HB)						
2003-06-17	TYPE : 109B50/00 BRAND : PHILIPS			8639 000 14291			
NAME C.C.LIAO	SUPERS.	25	590 — 25	10		A4	
TY CHECK	DATE 2003-06-17	Property of PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.-B.E.					

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TELEVISION/MONITOR SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Safety Checks

After the original service problem has been corrected,a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition,which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barries, covers, strain reliefs, and other hardware have been installed in accordance with the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints,solder splashes,sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord).Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout,lead length, and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with ans by the Ref. No. in the parts list and enclosed within a broken line * (where several critical components are grouped in one area) along with the safety symbols on the schematic diagrams and/or exploded views.
7. When servicing any unit, always use a separate isolation transformer for the chassis Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug.) Defeating this safety feature may create a potential hazard to the service and the user. Extension cords which do not incorporate the polarizing feature should never be used.
9. After reassembly of the unit, always perform an leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also check all metal control shafts(with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit may be safety operated without danger of electrical shock.

* Broken line

Implosion

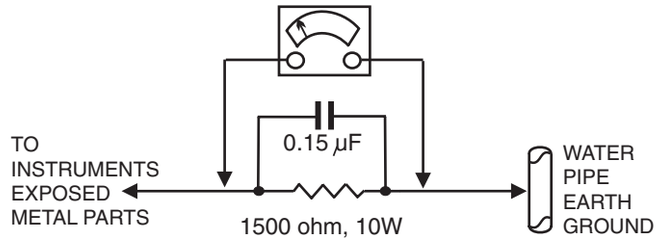
1. All picture tubes used in current model receivers are equipped with an integral implosion system. Care should always be used, and safety glasses worn,whenever handling any picture tube. Avoid scratching or otherwise damaging the picture tube during installation.
2. Use only replacement tubes specified by the manufacturer.

X-radiation

1. Be sure procedures and instructions to all your service personnel cover the subject of X-radiation. Potential sources of X-rays in TV receivers are the picture tube and the high voltage circuits. The basic precaution which must be exercised is to keep the high voltage at the factory recommended level.
2. To avoid possible exposure to X-radiation and electrical shock, only the manufacturer's specified anode connectors must be used.
3. It is essential that the service technician has an accurate HV meter available at all times. The calibration of this meter should be checked periodically against a reference standard.
4. When the HV circuitry is operating properly there is no possibility of an x-radiation problem. High voltage should always be kept at the manufacturer's rated value-no higher - for optimum performance. Every time a color set is serviced, the brightness should be run up and down while monitoring the HV with a meter to be certain that the HV is regulated correctly and does not exceed the specified value. We suggest that you and your technicians review test procedures so that HV and HV regulation are always checked as a standard servicing procedure, and the reason for this prudent routine is clearly understood by everyone. It is important to use an accurate and reliable HV meter. It is recommended that the HV recorded on each customer's invoice, which will demonstrate a proper concern for the customer's safety.
5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, reduce the line voltage by means of a Variac to bring the HV into acceptable limits while troubleshooting. Do not operate the chassis longer than necessary to locate the cause of the excessive HV.
6. New picture tubes are specifically designed to withstand higher operathng voltages without creating undesirable X-radiation. It is strongly recommended that any shop test fixture which is to be used with the new higher voltage chassis be equipped with one of the new type tubes designed for this service. Addition of a permanently connected HV meter to the shop test fixture is advisable. The CRT types used in these new sets should never be replaced with any other types, as this may result in excessive X-radiation.
7. It is essential to use the specified picture tube to avoid a possible X-diation problem.
8. Most TV receivers contain some type of emergency "Hold Down" circuit to prevent HV from rising to excessive levels in the presence of a failure mode. These various circuits should be understood by all technicians servicing them, especially since many hold down circuits are inoperative as long as the receiver performs normally.

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled receiver directly into the ac outlet.
2. Connect a 1.5k, 10w resistor paralleled by a 0.15uf. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed.(Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Picture Tube Replacement

The primary source of X-radiation in this television receiver is the picture tube. The picture tube utilized in this chassis is specially constructed to limit X-radiation emissions. For continued X-radiation protection, the replacement tube must be the same type as the original, including suffix letter, or a Philips approved type.

Parts Replacement

Many electrical and mechanical parts in Philips television sets have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards

WARNING : Before removing the CRT anode cap, turn the unit **OFF** and short the HIGH VOLTAGE to the CRT DAG ground.
SERVICE NOTE : The CRT DAG is not at chassis ground.